UNITED STATES ARMED FORCES
MEDICAL JOURNAL

Volume VIII November 1957 Number 11

MAN IN A SPACE VEHICLE

DAN C. OGLE, *Major General, USAF (MC)*

SCIENTIFIC REALITY today stimulates our imagination as did the fiction of Jules Verne in the last century. This author of sensational pseudoscientific romances of adventure wrote of fantastic technological developments and inventions, many of which have subsequently become realities. Our wonder was indeed stimulated by "Five Weeks in a Balloon," "Twenty Thousand Leagues Under the Sea," "A Trip to the Moon," "Around the World in Eighty Days," and "Hector Servados," one of his lesser-known books which described life on a comet. Science is moving so rapidly that is is difficult to distinguish between reality and science fiction. I have heard reliable scientists say that we can do anything we really want to do.

Recently at a research conference in my office, Colonel John Paul Stapp reminded us that people in high places were continuing to write obituaries for space flight, yet the idea refuses to stay dead. For example, the Washington *Evening Star* of April 24, 1957[1] carried the announcement that fabrication had started on the X-15, a rocket-powered research plane expected to fly higher and faster than any other manned aircraft, and that Pentagon officials had let it be known that the new craft may reach a speed of 4,000 miles an hour and fly as high as 200,000 feet. In my opinion, that is space flight. Since then there have been hints of an X-30, the nature of which I have no idea. Some conceive space as outside our atmosphere, and others as beyond the earth's gravitational pull. Being interested in the human factors involved, I

Presented on 16 May 1957 in Birmingham, Ala., at a symposium on "The Age of Space" sponsored by the Southern Research Institute. General Ogle is Surgeon General of the Air Force.

Reprinted from the U. S. Air Force *Medical Service Digest* 8: 2-8, Sept. 1957.

think of space flight as that which requires the traveler to take his environmental needs with him in a sealed cabin or capsule. I could actually stretch my definition to include lower levels.

Doctor Edward Teller,[2] in an article entitled "Science in the United States" appearing in the *Air Force* magazine for April 1957, expressed himself as follows: "I am talking about space travel, about going to the moon. Why should we? I haven't found a good practical reason. I haven't found a good military reason. I don't know how good and practical Columbus' reasons were. In the end something practical came of them." Doctor Teller goes on to discuss our interest in the unknown and unexplored which is the mainspring and justification of all adventures and expresses his personal concern that unless we expand our own scientific interests and capabilities, the first close-up pictures of the moon will be brought back by other than Americans.

In recent publicity releases, an aircraft corporation makes no apology for such statements as, "Space travel, a dream five years ago is now so near reality that lunar landings are predicted by the end of this century.... With the possibility of interplanetary flight accepted by engineers, man now looks to outer space and is speculating on new power sources needed to get him there. A predicted break-through is the plasma engine which will harness ions or light itself to drive aircraft nearly 186,000 miles per second."[3] I must admit here that I have never heard of such a predicted break-through or of a "plasma engine," but the term did forcefully bring to my mind that the "plasma engine" with which I have some familiarity—man himself—continues to be much the same old model, having enjoyed no engineering improvements since generations before the dawn of history. If space travel is to proceed much beyond that which is accomplished by air vehicles already in operation, then much must be done to select, train, and sustain the human "plasma engine" in four dimensional environments that are becoming increasingly harassing and complex.

We have not yet scratched the surface of human reaction to the fourth dimension of time as a factor in extraterrestrial environments. Adapting people to this air age is still in its infancy. Even yet we encounter people who doubt that the simple aircraft is here to stay. We in the Air Force receive frequent complaints from people who resent aircraft noise, and the occasional sonic boom is being accused of every type of destruction from impotency of minks to fractured dental plates.

Publicly accepted or not, a rocket-powered manned aircraft is reported to have flown approximately 2,000 miles per hour, reaching an altitude nearly 24 miles. I repeat that by my own definition that was space flight. Within the next five years jet-powered air-

craft will be operating routinely as high as 16 miles at speeds around Mach 3. If not at this point, then shortly beyond lies the province of space; at these borders man needs much the same physical or environmental support as he requires in true space. Vehicles powered by rocket engines need no air either for lift or to burn their fuels, yet man's seaside atmosphere must accompany him wherever he goes, whether at altitudes of 16 miles or on a two-year round trip to Venus—our closest neighboring planet.

ACCLIMATIZATION TO SPACE

With this introduction I have attempted to establish the point that from the interests of aviation medicine and human engineering, space flight is now upon us, for earth-bound man requires special medical and physiologic support almost from the time he leaves the ground. Properly selected and trained, he can fly well in an open cockpit up to an altitude of 10,000 feet. Breathing 100 per cent oxygen, he can go to between 30 and 40 thousand feet, but at these levels he needs added protection from decreased barometric pressure and from falling temperatures. Beyond this, oxygen must be supplied under pressure by mask, or by cabin or suit pressurization. No cabin pressurization system is foreseen that would carry the occupant of an air vehicle beyond 70,000 feet, as at this point the bulk of the equipment required to compress the thin air and the heat generated thereby are of such magnitude that a sealed cabin or capsule is mandatory.

Several years ago Major General Harry G. Armstrong,[4] in starting a space medicine department at the U. S. Air Force School of Aviation Medicine, called attention to successful animal-carrying rocket flights and remarked that space medicine studies were indicated because, as he expressed it, "If monkeys can do it, we can learn to do it."

Many new scientific processes of recent years have forged interlocking bonds between medical science and engineering. Space medicine is linked with several scientific disciplines dealing with extraterrestrial matters. Recently some educators have gone so far as to recommend engineering as a prerequisite to the study of medicine, and earlier this month Doctor Harvey E. Savely[5] of the U. S. Air Force Office of Scientific Research, in a special report to the Aero Medical Association in Denver, called attention to various technologies and disciplines required for research in aviation physiology. In summary, his paper stated that advances in aircraft design are making less critical the traditional physiologic problems in environmental protection. They will always be a challenge, of course; however, he emphasized new environmental factors presented by radiation and unusual patterns of acceleration. New demands are being made on man's endurance and performance under a wide variety of complex situations. We are becoming

increasingly dependent on the applied aspects of medical or physical dynamics, psychology and physiology, often referred to as human engineering. These applications indicate that research in aviation physiology will be characterized by increasing emphasis on the central nervous system and on the biochemical and biophysical aspects that have a regulatory influence on human health and effectiveness. The fundamental biologic mechanisms underlying human behavior and performance demand great consideration in any circumstance of space flight.

It is vogue in any scientific or research atmosphere to announce that we stand on the threshold of a great "break-through." Any speaker who omits his break-through routine is not up on current custom.

In any event, the human body and mind are now revealing secrets hitherto believed as ephemeral as thought itself. The psychiatrists are at one with the biochemists, and previously unknown enzymes and toxins are becoming the substance of psychoses or sanity; various steroids, hormones, and other biochemical substances may be valuable indicators of latent stability, resistance, anxiety, heroism, or fear. Human chemistry may determine our susceptibility to collapse or disease, and the electrophysical properties of the skin may tell the scientists our capacity for continuing awareness. The electrowaves of brain activity may act as a radar to warn of approaching impacts on the psyche.

These are human areas that must be more fully researched before we can select and fit candidates to withstand the traumatic influences of prolonged space living.

HAZARDS OF UPPER ATMOSPHERE

To better understand the environmental hazards of space flight, it is appropriate to discuss the characteristics of the upper atmosphere and space, the nature of feasible space vehicles, the forces and fuels required for such travel, and the element of time as it relates to human tolerance and survival. The biophysical considerations imposed by the four areas just mentioned are very challenging. It is necessary that whatever is needed by man to adequately sustain him for the entire duration of any contemplated flight, including air, water, food, and recreation, must be complete within the sealed capsule of the vehicle. In addition to a constant supply of these necessities, all waste materials must be eliminated or converted for re-use. If this capsule can be made efficient, then the absence of ambient air *per se* does not pose a problem from the respiratory standpoint.

The engine of the machine itself may produce heat or radiation and certainly will result in accelerative and decelerative forces traumatic in nature at the start and at the termination of rocket

flights into space. But perhaps we will find that the most traumatic factor of all is that of time and confinement within a sealed cabin, traveling in a lonesome void. Even today in prolonged flight at present operational altitudes, we are encountering by-products of isolated monotony which Clark and Graybiel[6] of the U. S. Naval School of Aviation Medicine, Pensacola, Fla., describe as the "break-off phenomenon" or a feeling of separation from the earth.

In addition to the break-off phenomenon, we occasionally hear of vague yet disturbing and possibly fatal episodes of fascination or hypnotic reactions resulting from target or instrument concentration. Similar popular explanations are given as reasons for the occasional disappearance of skin divers, men in another environment foreign to normal human experience.

Woodburn Heron[7] in an article, "The Pathology of Boredom," said that "... the problem of human behavior in monotonous situations is becoming acute." He was speaking of increasing automation—or dial watching. Heron reported a series of experiments and concluded that "... normal functioning of the brain depends on a continuing arousal reaction (incident to) ... constant sensory bombardment." However, sensory stimuli rapidly lose their power to arouse if they are restricted to the monotonously repeated stimulation of an unchanging environment or circumstance. A quote from a concluding paragraph is as follows: "Prolonged exposure to a monotonous environment, then, has definitely deleterious effects. The individual's thinking is impaired; he shows childish emotional responses; his visual perception becomes disturbed; he suffers from hallucinations; his brain-wave pattern changes."

The earth is surrounded by a sea of compressible air, 99 per cent of which lies within 20 miles above the earth's surface. We can readily see then that for practicable purposes as far as oxygen is concerned, space is relatively near the earth. As we ascend to altitude and barometric pressure is decreased, the partial pressure of oxygen (and hence that available to us) is correspondingly decreased. At 18,000 feet the barometric pressure and partial pressure of oxygen are one half that found at sea level; at 33,000 feet, one fourth; at 38,000 feet, one fifth; at 50,000 feet, one ninth; and at 100,000 feet, one ninety-fifth. These data emphasize the requirement for a sealed self-contained and self-sufficient cabin for human flight, now possible in aircraft type of "spaceships" already in being.

The layer of atmosphere adjacent to the earth is called the troposphere. Its thickness varies with latitude and seasons but averages about 35,000 feet. Within the troposphere lies more than 75 per cent of the atmospheric bulk and almost all of the storms and weather. Electromagnetic storms, however, are generated by

sun activity resulting in unusual ionic bombardment of our atmosphere. Electromagnetic radiation with energy sufficient to light up the northern lights, to interfere with radio transmission and reception, and to increase the earth's background of cosmic radiation, is frequently reported. Such "storms" may present problems in space. At 60,000 feet protection from cosmic rays and ultraviolet radiation by the atmosphere begins to diminish. There has been much speculation concerning the hazard from cosmic rays and early fears seem to have been exaggerated. However, the final word on this has not yet been spoken.

The effects of cosmic radiation are now being studied at Holloman Air Force Base, New Mexico, where mice are being sent to extreme altitudes and observed for biological effects. Except for the possible effects of violent electromagnetic storms, data on which are incomplete, we are not exposed to significant primary cosmic radiation below 60,000 feet because of the protection afforded by the atmosphere. Secondary lower voltage rays do reach us at all levels but are believed to be relatively harmless. Some believe that protection against cosmic radiation similar to that afforded by the atmosphere can be taken over by a cabin's hull in space flight; on this point, I cannot argue. Once the exact medical hazard is determined, protection will be a function of the engineer. Doctor Hermann J. Schaefer[8] of the U. S. Naval School of Aviation Medicine, an authority on cosmic radiation, warns that commercial airlines should not risk flight above 90,000 feet as it has not been proved that mutations or malformations following such flights were not caused by cosmic radiation.

During the winter 1953-1954 an aluminum-covered film pack was struck by some strange particle from outer space during a research balloon test at 100,000 feet—the space particle went through the film pack like a bullet through a deck of cards. In doing so it produced a scientifically thrilling sequence of what appeared to be the conversion of earthy matter into energy and then a reconversion of this energy into another form of earthy matter. Such reports give us pause in contemplating space flight —I'm sure a mutation-fearing wag would spell pause with a "W."

At an altitude of 75 miles the atmosphere no longer has a protective function against meteorites. Although in space flight the probability of collision with meteorites is remote, some thought must be given to protection against them. Meteorite bumpers or meteor screens consisting of an outer layer of steel around the hull of spaceships have been suggested. Perhaps of more concern is the build-up or accumulation of energy by a fast traveling spaceship. Doctor Heinz Haber,[9] an astrophysicist, stated that at one twentieth the speed of light in space, the

energy equivalent striking the ship would be equal to 4,000 suns, causing immediate vaporization. It must be presumed then that somewhere far below such speeds there is an energy accumulation barrier. I am not one to say that barriers cannot be surpassed.

Also, at this altitude the scattering of visible light by the dust and molecules ceases. This brings about the so-called darkness or twilight of space with the stars visible at all times, yet with objects in sunlight dazzlingly bright against the blackness of shade. At 75 miles the transfer of sound by the atmosphere also ceases, thereby producing the quietness of space. This may serve to emphasize the psychologic break-off phenomenon previously mentioned.

IMMINENCE OF ROCKET FLIGHT

Planetary space flight may not be a reality until some time in the distant future. However, rocket flight involving space travel from one point of the earth to the other is just around the corner. The Secretary of the Army[10] recently predicted the use of rockets as troop transports whereby soldiers could be quickly and silently dropped into enemy territory. Many of the problems involved in interplanetary travel will be involved in rocket travel from one point on the earth to another. The rocket will be shot from the earth by a short burst of propulsion with high G force acceleration and will coast in an elliptical course after power has been shut off. It will then glide to a point of destination. Such flights at altitudes of 100 miles or more and speeds up to 15 times that of sound are envisioned. In such flights many problems involved in prolonged space flight will be encountered.

In the stratosphere, flight at great speeds produces tremendous amounts of heat because of the transfer of heat from air molecules to the skin of the aircraft. This heat effect has been called the "thermal barrier." Control of this heat is an engineering problem. However, at an altitude of 120 miles above the earth's surface, the air is too thin to cause frictional heat effects at any speed. Therefore, above 120 miles the temperature of the cabin's hull is governed by the sun's radiation.

Accelerations or G forces occur in all flights during such maneuvers as pull-out from dives or in turns. When a person is accelerating in the direction from his feet to his head, the forces of inertia act in the opposite direction; this is called positive G. When a person is accelerating footward and the forces of inertia are headward, it is negative G. Positive G forces tend to cause blackout; negative G. forces, redout. In present-day, high-performance flying by the use of G suits and restraining devices, man has been able to withstand forces within the structural limits of his aircraft. It may be a different story with true

rockets. However, it is calculated that we could tolerate the G forces of attaining a speed of 25,000 miles per hour in 8 minutes. It takes such speed to break away from the earth's gravity into true space.

In horizontal flight under the pull of the earth's gravity, the airplane follows a curved line parallel to the curvature of the earth. In higher supersonic speed ranges, centrifugal forces begin to counteract the earth's gravitational forces bringing on the phenomenon of decreased weight or subgravity. At 18,000 miles per hour, or 5 miles per second, a state of zero gravity is reached. In other words, the pull away from the earth exactly equals the pull of gravity toward the earth. At a speed of 7 miles per second, an object will break away from the gravitational control of the earth and an "escape velocity" will exist. At the present time the state of zero gravity can be obtained in jet planes flying a parabolic arc for only one-half minute and in rockets for three or four minutes.

Experiments concerning the psychologic effects of weightlessness are being studied at the Air Force School of Aviation Medicine, and have been studied at the Aero Medical Laboratory and the Aero Medical Field Laboratory. Studies indicate that by adaption the effects of zero gravity may be overcome; at least, by some people. Various subjective symptoms have been reported during the weightless state. Some have felt exhilarated; others have become peculiarly uncomfortable; some have become violently nauseated. The subjective sensation of falling is produced, like going over the top of a roller coaster. This is due to the disturbances of ordinary impulses which depend on the pull of gravity. It is quite likely that man will be able to adjust to a prolonged state of weightlessness, both psychologically and physiologically, regarding muscle and position control. However, it is too early to say whether or not serious medical problems might not result. The space-vehicle designers say they can create required gravity by spinning the ship. Time can only tell whether or not this will help or become our ever-so-great-grandchildren's substitute for "sit down you are rocking the boat."

Sustained flight above 70,000 feet is only possible when man carries his own atmosphere in a hermetically sealed cabin. This raises the interesting question of providing a closed ecological system in which man can live. In a sealed cabin he needs oxygen to breathe and some method of removing carbon dioxide and other body gases and wastes, as well as excess water vapor. The "climatization" of such a sealed cabin is one of the problems of today. The School of Aviation Medicine has a sealed cabin simulator which now serves as a research tool and will later serve for indoctrination. The possibility of future flights of a week or a month's duration has prompted the sponsorship of stud-

ies concerning the use of plants for photosynthesis, oxygen production, and carbon dioxide removal in a closed system. So far, in these studies carried on at the University of Texas, it has been found that about 2.3 kilograms of a certain green alga, the *Chlorella pyrenoidosa*, are sufficient to balance the gas metabolism of one man. Such a photosynthetic gas exchanger may one day be useful. For instance, in manned satellites, possibly artificial photosynthesis may be achieved.

Experiments must be continued concerning the maintenance of a livable environment in a sealed cabin. Perhaps the exploration of other methods of supplying oxygen and removing carbon dioxide, and the reconversion of waste solids and fluids to a usable state, is the answer.

NEW SELECTION METHODS LIKELY

You will recall that I have previously stated that there has been little change in the model or general equipment of human beings for thousands of years. I can say, however, that modern medicine is learning much more about ourselves and that progress made in the past few years is comparable to the break-throughs in other scientific areas. We are learning more of the mechanisms of the central nervous system, both in the electrophysical aspects and in the biochemical areas, and it may be that with this increased knowledge of the physics and chemistry of our central nervous system, of our endocrine system, and of our very emotional content, we will develop much better technics and processes for the selection, adaptation, and maintenance of people who will some day be called upon to man spaceships. Such a person must be all that the best aviator is today as well as being constitutionally and emotionally suited for the physical and emotional traumatic influences of sealed cabins speeding, heaven knows where, through the awful silence of a timeless and a darkened sky.

I could remain entirely within the realm of reality by predicting that we may in the near future be able to select and adapt human beings for specialized environmental circumstances by blood studies and adjustments of various steroids, hormones, and enzymes, by urine studies to determine adrenal gland activity, by galvanic sensitivity tests of the skin to determine the threshold of central nervous system awareness, by determination and adjustment of metabolic processes, and by brain studies through selected area electroencephalography.

There is so much that we have just begun to learn or even suspect—so much we must know about ourselves as human beings and human souls—before we can leave our mother earth for any length of time and have hope of returning. When I think of space travel beyond our own little world, I am reminded of a line from

my favorite spiritual—"Everybody talkin' 'bout Heaben aint gwain there."

REFERENCES

1. Fastest rocket plane work is under way. *Evening Star,* Washington, D. C., Apr. 24, 1957. p. A-2, columns 7 and 8.
2. Teller, E.: Science in the United States. *Air Force* 4: 102, 104, 107, Apr. 1957.
3. Douglas Aircraft Corporation: *The First Men on the Moon.* (advertisement) *Air Force* 4: 64-65, Apr. 1957.
4. Armstrong, H. G.: Cited in Lipscomb, F. E.: Military hygiene in transition. *Pub. Health* 68: 97-101, Apr. 1955.
5. Savely, H. E., and Henry, J. P.: New look at aviation physiology. *J. Aviation Med.* (in press)
6. Clark, B., and Graybiel, A.: Break-off phenomenon: feeling of separation from earth experienced by pilots at high altitudes. *J. Aviation Med.* 28: 121-126, Apr. 1957.
7. Heron, W.: Pathology of boredom. *Scientific American* 196: 52-56, Jan. 1957.
8. Schaefer, H. J.: Biologic effects of cosmic radiation. In White, C. S., and Benson, O. O., Jr. (editors): *Physics and Medicine of the Upper Atmosphere: A Study of the Aeropause.* University of New Mexico Press, Albuquerque, New Mexico, 1952. pp. 290-315.
9. Haber, H.: The astrophysicist's views (in Space Travel: A Symposium). *J. Aviation Med.* 29: Oct. 1957.
10. Brucker, W. M.: Cited in Virden, J. M.: Shape of future conflicts is sketched by Gavin Teller at Army conference. *Army-Navy-Air Force Register* 77: 1, Nov. 3, 1956.

USE OF UROPEPSINOGEN DETERMINATION

"Determination of the concentration of pepsinogen in the urine can be technically practical and clinically useful. It may offer a better index of gastric peptic activity than does intubation, and it has been useful in the differential diagnosis of peptic ulcer versus gastric carcinoma. Uropepsinogen values can aid in locating the site of hematemesis and can assist in the diagnosis of pernicious anemia. The response of uropepsinogen to hormone stimulation may provide many diagnostic, as well as therapeutic, indexes to endocrinological conditions."

—WILLIAM P. PEAK, M. D.;
ELLENMAE VIERGIVER, Ph. D.;
EDWARD J. VAN LOON, Ph. D.;
and GARFIELD G. DUNCAN, M. D.
in *Journal of American Medical Association,* p. 1441, Dec. 15, 1956

AEROTITIS MEDIA AND AEROSINUSITIS IN SUBMARINE TRAINEES

A Prophylactic Study

JOHN H. SCHULTE, *Lieutenant Commander, MC, USN*

AEROTITIS media and aerosinusitis are clinical entities that result from failure to equalize the pressure in the middle ear cavities and sinuses to that of an increasing or decreasing ambient atmospheric pressure. Armstrong[1] stated that aerotitis occurs when there is inadequate ventilation of the middle ear cavity during ascent or descent.

Barotrauma of the middle ear occurs less commonly from exposure to a decreasing atmospheric pressure. This is due to the movement of the cilia and the flutter-valve action of the ostium of the Eustachian tube, which favor the flow of air from the tympanic cavity to the nasopharynx and oppose movement in the opposite direction. Swallowing, yawning, and similar physiologic actions open the ostium of the Eustachian tube, permitting the passage of small volumes of air. In a decreasing atmospheric pressure (ascent), there is little to hinder air flow from the middle ear to the nasopharynx.

When the atmospheric pressure is increasing, the pressure in the nasopharynx tends to hold the Eustachian tube closed. This makes it necessary to use forced swallowing, yawning, or the Valsalva maneuver to produce equilibrium in the middle ear cavity.

Any acute or chronic disease that produces edema or congestion of the mucosa or lymphoid tissue in the vicinity of the ostium of the Eustachian tube, makes equalization more difficult or even impossible. The effect of barometric pressure changes on the middle ear and sinuses may range from a minor hyperemia to serious pathologic changes with effusion, hemorrhage, suppuration, and rupture of the ear drum.

Teed[2] developed a system of grading the degree of damage to the ear as determined by otoscopic examination. In grade I aero-

From U. S. Naval Medical Research Laboratory, Submarine Base, New London, Conn. Comdr. Schulte is now assigned to Pittsburgh Area Branch Office, U. S. Atomic Energy Commission, P. O. Box 423, Idaho Falls, Idaho.

titis media, there is retraction of the tympanic membrane with peripheral blood vessel congestion. Grade II shows retraction of the drum with generalized redness in all quadrants. In grade III, there is transudation of serum into the middle ear cavity, giving the drum a yellowish appearance. Grade IV shows hemorrhage into the middle ear cavity with or without rupture of the tympanic membrane. The middle ear cavity may be filled completely with blood, making the ear drum appear black.

Grade I aerotitis media causes pain and transient muffling of sound without loss of auditory acuity. The symptoms last 12 to 24 hours. Nose drops containing a vasoconstrictor will help to relieve the pain.

Patients with grade II aerotitis media complain of severe pain and some loss of hearing. Catheterization of the Eustachian tube may correct the drum retraction but does not reduce the pain or redness. Complete recovery with return of normal auditory acuity usually occurs in 24 to 48 hours.

A grade III aerotitis media causes pain, a feeling of fullness in the ears, loss of hearing, and tinnitus. Inflation of the Eustachian tube and daily shrinkage of the tubal mucosa is the recommended treatment. Recovery usually occurs in three to five days. If the fluid is not absorbed within a week, some authors[3, 4] recommend myringotomy and suction.

Patients with a grade IV aerotitis media may have no pain whatsoever. A feeling of fullness in the ears, tinnitus, and a definite loss of hearing are the symptoms commonly noted.[4, 5] Auditory acuity is recovered in five to ten days; however, permanent partial deafness may occasionally result. When rupture of the tympanic membrane occurs, it usually will heal completely in two to five days, if infection does not supervene.

Shilling[5] found that 27.5 per cent and 30 per cent of two groups of 858 and 708 otherwise healthy young men had difficulty leading to aerotitis media when subjected to increased atmospheric pressure. These men had been screened carefully for submarine service to eliminate those with a history of severe or chronic upper respiratory infections, ear disease, asthma, hay fever, and other related allergies. Presumably, an even greater percentage of the general population would be so affected by atmospheric pressure changes, thus limiting them to some degree or precluding them completely from occupations involving commercial air travel, mining, commercial diving, and tunnel (caisson) work, as well as hobbies such as amateur flying, skin diving, and spear fishing.

The effect on the military service is to limit the number of otherwise healthy men who can qualify for aviation, submarine

service, deep-sea diving and salvage, and underwater demolition teams. Additionally, aerotitis media or aerosinusitis may temporarily incapacitate men who are qualified in these military specialties. For this reason, a study was undertaken to evaluate the prophylactic effect of several different topical drugs on the incidence and severity of aerotitis media and aerosinusitis.

METHOD AND MATERIALS

This study was accomplished using the double blind technic. The drugs and saline solution were supplied in identical two ounce plastic squeeze bottles labeled consecutively from 0001 to 5000.* Neo-synephrine Hydrochloride (brand of phenylephrine hydrochloride) 0.25 per cent, thonzonium bromide 0.5 per cent, phylephrine hydrochloride and thonzonium bromide in combination, and Biomydrin** were the drugs used in this study. Normal saline was used as a control.

Phenylephrine hydrochloride is a widely used vasoconstrictor, known to have rapid and lasting effects and an almost complete absence of side reactions.[6] Thonzonium bromide is a synthetic wetting agent with a marked mucolytic action.[7,8] Biomydrin, in addition to containing a vasoconstrictor and a mucolytic agent, also contains an effective antihistaminic.[9,10]

A total of 4,876 consecutive candidates for submarine training were used as subjects in this study. Of these, 72 per cent were between the ages of 17 and 25, while 28 per cent were from 26 to 39 years of age. Each trainee received a thorough physical examination within four days prior to his pressure test. All were found to conform to the current physical standards for submarine service.

On the day of the pressure test, a history was taken including present illnesses and past history of acute and chronic upper respiratory infections, ear disease, asthma, hay fever, and related allergies. The ears, nose, and throat of each trainee were then examined. All candidates who had objective evidence of severe upper respiratory infection and those who were receiving any form of medical therapy for an upper respiratory infection were excused from the test and were not included in the study.

All the remaining candidates were instructed in the technics of equalizing the pressure in their middle ears. Each trainee was then given a squeeze bottle and instructed in its proper use.

*The author is indebted to the Nepera Chemical Co., Inc., Yorkers, N. Y., for supplying all drugs and materials used in this study.

**Brand name for preparation of Neomycin Sulfate, 0.1 per cent; Gramicidin, 0,005 per cent; Thonzylamine Hydrochloride, 1.0 per cent; Thonzonium Bromide, 0.05 per cent; and Phenylephrine Hydrochloride, 0.25 per cent.

444645 O - 57 - 2

Upon completion of the pressure tests, each trainee was asked if he had any difficulty or pain during the test, and his ears, nose, and throat were re-examined. The tympanic membranes were graded in accordance with Teed's[2] classitication. Mucous membranes of the nose were graded as normal or as slightly, moderately, or severely congested. The results were recorded, along with the pretest findings and code number of the drug used.

RESULTS

There was no significant statistical difference between the findings on subjects in the 17 to 25 age group and those on subjects from 26 to 39 years of age.

As shown in table 1, there was physical evidence of injury to one or both ears of 1,357 (27.9 per cent) of the subjects. Of the 234 (4.8 per cent) who also failed the pressure test, 230 failed because of earache, 3 because of sinus pain, and 1 for psychological reasons.

TABLE 1. *Symptoms of aerotitis media and aerosinusitis as observed in entire group of subjects and in those having a history of allergy*

Symptom or sign	Total group		Alergy group	
	Number	Per cent	Number	Per cent
Total	4876		186	
Ear damage	1357	27.9	101	54.3
Ear pain	576	11.8	79	42.4
Failed test	234	4.8	64	34.4
Sinus pain	161	3.3	9	4.8
Toothache	96	1.9	1	0.5
Nose bleed	48	0.9	3	1.6

A positive history for allergy was elicited from 186 of the 4,876 candidates tested. Of these, 101 (54.3 per cent) incurred injuries to one or both ears; 79 had earaches, 9 had sinus pain, 3 had nose bleeds, and 1 developed a toothache. Sixty-four (34.4 per cent) failed because of earache. Two of these also had sinus pain.

None of the topical drugs tested exerted a significant prophylactive effect, and any differences observed were well within the limits of random variation. This was true not only concerning

observable ear damage (table 2), but also with reference to the occurrence of symptoms and the state of the nasal mucosa. In 186 subjects with positive histories of allergy, there was some indication that Biomydrin and thonzonium bromide may have been of benefit in reducing the incidence of symptoms and of damage to the sinuses and ears, but the size in this group was too small for definite statistical conclusions.

TABLE 2. *Ear damage observed by otoscopic examination after pressure test following prophylatic use of various topical drugs*

Test material	Grade of ear damage					Number of ears damaged	Total
	O	I	II	III	IV		
Total	7505	1189	551	406	99	2245	9752
Normal saline	1516	248	113	81	22	464	1980
Phenylephrine	1491	233	114	76	22	445	1936
Thonzonium	1513	236	110	84	23	453	1966
Phenylephrine & thonzonium	1493	240	110	86	17	453	1946
Biomydrin	1494	232	104	79	15	430	1924

DISCUSSION

The high percentage of damage and failure among subjects with allergic histories supports the premise that they are a poor risk for occupations involving atmospheric pressure changes.

Aerosinusitis and toothache were found to be of relatively little importance in regard to failure to pass the pressure test. Only three failed because of sinus pain alone, and none failed because of toothache alone.

The remarkably low incidence of failure when compared to ear damage can be attributed to two reasons. First, submarine candidates are highly motivated, and their career in submarines is dependent upon their ability to pass the pressure test. Second, the degree of pain and discomfort may not be as severe as is indicated by otoscopic examination.

Comparison of those trainees having ear damage showed that the incidence and severity of pain were greater in those with grades I and II aerotitis media than in those with grades III and IV. It is reasonable to anticipate that pain will occur when the tympanic membrane is stretched and retracted, but understand-

able that the pain might diminish or disappear when the middle ear cavity becomes filled with fluid or the tympanic membrane ruptures and equilibrium is again restored. The technic of rapidly exceeding the pressure differential necessary to rupture the ear drum when normal equilibrium cannot be maintained, has been frequently reported to diving medical officers by deep sea divers.

SUMMARY

A study of the prophylactic use of intranasal medication for aerotitis and aerosinusitis in 4,876 subjects is reported, with a brief discussion of the etiology, pathology, and treatment of these conditions. An explanation is proposed for the discrepancy between severity of symptoms and degree of damage.

No statistically significant effect in the prevention of aerotitis media and aerosinusitis was observed from the use of a vasoconstrictor, a mucolytic agent, or an antihistaminic, alone or in combination.

REFERENCES

1. Armstrong, H. G.: *Principles and Practice of Aviation Medicine*. Williams & Wilkins Co., Baltimore, Md., 1939. p. 207.

2. Teed, R. W.: Factors producing obstruction of auditory tube in submarine personnel. *U. S. Nav. M. Bull.* 42: 293-306, Feb. 1944.

3. Teed, R. W.: Contribution of war experience to etiology of otitis media. *Tr. Am. Acad. Ophth.* 53: 254-260, Jan.-Feb. 1949.

4. Trowbridge, B. C.: New treatment of acute aero-otitis media. *Arch. Otolaryng.* 50: 255-263, Sept. 1949.

5. Shilling, C. W.: *Aero-Otitis Media and Auditory Acuity Loss in Submarine Escape Training*. Project X-434, Report No. 1, Medical Research Department, U. S. Submarine Base, New London, Conn., Oct. 8, 1944.

6. Council on Pharmacy and Chemistry, American Medical Association: *New and Nonofficial Remedies*. J. B. Lippincott Co., Philadelphia, Pa., 1952. p. 190.

7. Lazar, A. M., and Goldin, M.: Intranasal medication with antibiotic-decongestant solution. *Eye, Ear, Nose & Throat Month.* 32: 512-515, Sept. 1953.

8. Kaplan, M. A. (Chicago); Aaronson, A. L.; and Goldin, M.: Effect of biomydrin on nasal mucosa of allergic persons during 1953 ragweed pollinating season. *Eye, Ear, Nose & Throat Month.* 33: 731-734, Dec. 1954.

9. Criep, L. H., and Aaron, T. H.: Neohetramine: experimental and clinical evaluation of allergic states. *J. Allergy* 19: 215-224, July 1948.

10. Schwartz, E.: Comparative toxicity and side effects of antihistaminic drugs. *Ann. Allergy* 7: 770-777, Nov.-Dec. 1949.

"Of a total population (world) of nearly 2.5 billion, over 1.5 billion suffer from one form of malnutrition or another."

—J. M. MAY, M. D.
in *MD*
p. 77, July-Aug. 1956

RELATION OF DISABILITY TO HYPOXEMIA AND CONGESTIVE FAILURE IN PULMONARY EMPHYSEMA

Analysis of 100 Cases

JAMES C. SYNER, *Major, MC, USA*

AS ONE ASPECT of a study of evaluation of disability in diseases of the chest with the aid of pulmonary function studies, 100 consecutive cases of obstructive pulmonary emphysema were analyzed to relate the clinical estimation of disability severity to the status of arterial oxygenation and of congestive failure in cor pulmonale. This analysis was prompted by interest in a similar study reported by Miller and co-workers,[1] and by repeatedly hearing physicians relate disability severity to arterial oxygen status. Frequently, when evaluating disability, only the status of arterial oxygenation would be requested. Reports on the results of ventilatory, exercise, and lung compartment studies often were met by a sarcastic "So what?" Not infrequently such studies were challenged as unreliable in profiling disability when personal (secondary) gain is involved.

This belief in the all important value of arterial oxygen status has been expressed repeatedly in the literature. Ornstein[2] stated that the diagnosis of emphysema could not be made unless carbon dioxide retention and arterial hypoxemia were demonstrated. Jacobs[3] was of the opinion that all symptoms in pulmonary emphysema could be attributed directly to a decreased capacity in oxygen utilization, resulting in anoxia. Massey[4] commented that the implication of dyspnea is oxygen lack. He stated that most types of dyspnea invoke anoxia, and that unless this concept is appreciated, oxygen deficiency will remain unnoticed until more obvious and serious signs appear.

On the other hand Wilson and co-workers[5] stated that hypoxia played only a minor part as a cause of dyspnea in obstructive emphysema. Miller and associates studied 240 cases of chronic pulmonary emphysema and concluded that severity of dyspnea

From Fitzsimons Army Hospital, Denver, Colo.

was not closely related to arterial hypoxemia. They considered that a normal arterial oxygen saturation could not be taken to mean that the patient was free of disability.

CASE MATERIAL AND METHODS

One hundred consecutive patients with obstructive pulmonary emphysema were studied. The diagnosis was made by history, physical examinations, roentgenography, fluoroscopy, and pulmonary function studies. A case did not have to present positive findings in all these areas to be classified as obstructive emphysema.

The patients were classified clinically into four groups according to the estimated degree of disability severity. The classification was based on statements made by the patient during the interview for clinical history. Except for slight modification, the scheme established by the New York Heart Association[6] for determining functional capacity was used in this study. The criteria were:

Group I.

A. The patients' activity was not limited by dyspnea.

B. They could walk an unlimited distance on the level at a normal brisk pace.

C. They were able to climb three or more flights of stairs without stopping or experiencing undue discomfort.

D. They were able to do prolonged work involving at least moderate exertion without stopping.

Group II.

A. In these patients there was a slight to moderate limitation of activity.

B. They could walk several city blocks on the level without stopping or discomfort, provided a normal pace was maintained.

C. They usually were able to climb two flights of stairs without stopping. After one flight, there usually was slight to moderate dyspnea, but it was at the end of the second flight that dyspnea usually necessitated stopping or produced discomfort.

D. Most of these patients were working full time at jobs with varied exertional demands. Some were doing farming or general labor.

Group III.

A. In these patients severe dyspnea usually imposed considerable limitation of activity.

B. They usually were unable to walk more than one or two city blocks on the level at a normal pace without pausing to rest.

C. They avoided stairs whenever possible, and one flight at a slow pace usually produced severe dyspnea.

D. They usually experienced marked weakness, easy fatigability, and the need for a great deal of rest and sleep.

E. Often, a mild degree of exertion was sufficient to produce paroxysms of cough.

F. Usually they were able to handle only sedentary work. The capacity to do part-time work with frequent rest periods was occasionally described.

Group IV

A. These patients often were dyspneic at rest.

B. They noted less daily variation in symptoms than did patients in Group III.

C. They usually were forced to rest before completing, at a slow walking pace along the level, a distance equivalent to one city block.

D. Stair climbing had been discontinued completely because of severe dyspnea and weakness.

E. They usually were unable to do any type of work, and on occasion needed assistance in eating, toilet, and dressing functions.

An ear-lobe oximeter as designed by Wood and Geraci[7] was used to determine arterial oxygen saturation. Values obtained by the oximeter were standardized by having the patient breathe 100 per cent oxygen, and the resultant values were considered to equal full (100 per cent) saturation. The patient was then tested on room air at rest and during exercise. Periodic checks of the oximeter readings were made against samples of arterial blood analyzed by a manometric technic.[8,9]

A standard exercise step test was used.[10] The patient performed the exercise for one minute or until dyspnea and fatigue made it necessary to stop. A maximum of three minutes was set for the exercise of the less disabled.

The clinical classification was determined before roentgenograms, physical examinations, fluoroscopies, or pulmonary function studies were evaluated. Detailed considerations were given to interview technics so as to obtain optimum interpersonal relationships. The interview was conducted in a private office setting, in preference to the open laboratory, and was not limited

to systematized questions and answers on "huffing and puffing." Each patient was provided an opportunity to talk about other problems and concerns. Insofar as possible, the situation was "warmed" by personalized attention, in order to minimize the impact from machines and strange gadgets.

RESULTS

As shown in table 1, 79 per cent of the patients were classified in Groups II and III. It is apparent from the criteria used to determine functional capacity that a significant difference in severity of disability can occur between patients in these two groups, and although the variation did extend from a slight to a severe degree of disability, the occurrence of hypoxemia in the two groups was nearly identical. Of the 35 patients in Group II, 45.7 per cent had hypoxemia at rest or exercise or both. Of the 44 in Group III, 45.5 per cent had hypoxemia at rest or exercise or both, while an additional 4.5 per cent had no hypoxemia at rest but were unable to exercise.

The differences in the severity of disability between Groups III and IV were not nearly as marked as between Groups II and III. In most instances, it was difficult to separate patients into either Group III or IV because of similarities in the patterns of their disabilities. The patients' statements that they had symptoms at rest and experienced a lesser degree of daily variation in symptoms were an important factor in placing patients in Group IV. Despite the absence of striking differences in disability severity, a notable difference in frequency of arterial hypoxemia was documented. Of the patients in Group IV, 83.3 per cent had hypoxemia at rest or exercise or both, while an additional 11.1 per cent had no hypoxemia at rest but were unable to exercise. This compares with 45.5 per cent and 4.5 per cent, respectively, for Group III. I was unable to correlate this difference between the two groups in frequency of hypoxemia with difference in degree of disability.

In the total series, 51 per cent demonstrated hypoxemia at rest or exercise or both, while 4 per cent had no hypoxemia at rest but were unable to exercise. One patient in Group II and and one in Group III showed hypoxemia at rest that returned to normal following the hyperventilation of exercise.

Table 1 demonstrates that hypoxemia could not be assessed as having a significant influence on exercise capabilities. Seventeen per cent of the total series had hypoxemia at rest and throughout the exercise step test, which they completed. Thirteen per cent had hypoxemia at rest, but were unable either to start or to complete an exercise test. Therefore, approximately the same number of patients who had arterial hypoxemia

TABLE 1. *Relation between severity of disability and presence of arterial hypoxemia in patients with pulmonary emphysema*

Classification of patients		Incidence of arterial hypoxemia											
		None at rest; unable to exercise		Present at rest; unable to exercise		None at rest or exercise		Present at rest and exercise		Present on exercise only		Present at rest only	
	Number	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Group I	3					3	100						
Group II	35					19	54.3	8	22.9	7	20.0	1	2.8
Group III	44	2	4.5	2	4.5	22	50	8	18.2	9	20.5	1	2.3
Group IV	18	2	11.1	11	61.1	1	5.6	1	5.6	3	16.6		
Total	100	4		13		45		17		19		2	

while at rest were able to complete the exercise test as were not able to complete it.

The importance of hypoxemia in cases of congestive failure in cor pulmonale in obstructive emphysema can be seen from table 2. Of 14 patients with congestive failure, one was in Group III and 13 were in Group IV. Only three of the 14 patients were free of hypoxemia at rest, and one of the three was hypoxic after exercise. The other two were unable to exercise because of weakness and/or dyspnea. One of these two had systemic hypertension, but the electrocardiogram demonstrated right axis deviation and the clinical signs were those of right heart failure. He had greatly increased lung volume with marked stigmata of air flow obstruction, so was diagnosed as having cor pulmonale with congestive failure.

TABLE 2. *Relation between severity of disability, arterial hypoxemia, and congestive failure in cor pulmonale in patients with pulmonary emphysema*

Patients with emphysema		Patients with congestive failure	Incidence of hypoxemia		
			Hypoxic at rest	Hypoxic only on exercise	No hypoxemia but unable to exercise
Disability classification*	Number	Number	Number	Number	Number
Group III	44	1	1		
Group IV	18	13	10	1	2
Total	62	14	11	1	2

*None of the 38 patients in Groups I and II had congestive failure.

DISCUSSION

That arterial hypoxemia did not correlate closely with severity of disability may be related to the following difficulties encountered during the clinical classification:

1. A question occasionally arose as to the reliability of the patient's account of his capacity to tolerate exercise. This applied to cases where symptoms may have been minimized as well as to those where they may have been exaggerated.

2. There sometimes was a problem as to the proper and most effective interviewing technic for a given patient. Language barriers, vocabulary differences, and hostility toward the situation were encountered, and the ability to communicate varied greatly among individual patients.

3. A number of patients stated that there were periodic variations in the degree of their symptoms, with episodes that varied from daily to weekly or monthly. As a result, some patients were studied at a time when symptoms were maximum, while others were studied when symptoms were minimum.

That arterial hypoxemia did not appear to have an important influence on exercise capabilities could be related to the following facts:

1. As the chief symptoms, dyspnea and easy exhaustion impose a marked limitation on exercise tolerance. They are so readily and markedly aggravated by even minimal exertion that prolonged activity is usually impossible.

2. Arterial hypoxemia may be delayed in onset. This is characteristic of the so-called "prolonged desaturation time" in emphysema described by Woolf, Gunton, and Paul.[11] If these patients were able to do more prolonged exercising, arterial hypoxemia probably would occur in a greater number of cases and to a greater degree.

Labored breathing and easy exhaustion are the result of abnormalities in the mechanics of respiration. Increased air-flow resistance manifested by inability to achieve a high rate of air flow during expiration, poor intrapulmonary mixing of gases, and large intrapleural pressure fluctuation during quiet breathing are the primary defects.[12] Increased force is required to move air into and out of the lungs. This force is supplied by the muscles of respiration increasing their work output. Alveolar hypoventilation is present because of poor intrapulmonary mixing of gases. The compensatory response to this is hyperventilation. A dilemma thereby exists for the emphysematous patient. He must meet the demands of alveolar hypoventilation by hyperventilating against resistant forces that increase the workload tremendously. Oxygen utilization is attained only by ventilating an abnormally large amount of air. This inefficient pattern of respiration is what is meant by the "increased work of breathing." Riley[13] has defined the work of breathing as the oxygen cost of breathing. He has demonstrated that patients with airflow obstruction must produce a large minute volume to effect a relatively small amount of oxygen utilization. Normal subjects are able to effect a much more efficient relationship between minute volume and oxygen utilization.

The prolonged desaturation time may be a function of the large functional residual capacity and poor intrapulmonary mixing of gases. Because of these two abnormalities, the patient starts the test with a large volume of oxygen in his lungs and an inefficient washout mechanism. Oxygen is slowly absorbed from

poorly ventilated areas and remains in relatively high concentration in these areas because of poor washout.

That congestive failure in cor pulmonale was limited almost entirely to patients with arterial hypoxemia raises the consideration of utilizing intermittent oxygen therapy. The importance of this therapy in patients with hypoxemia relates to current concepts of hypoxia and pulmonary hypertension. The effects of hypoxia on pulmonary circulation have been stressed by a number of investigators,[14-19] who have found a highly significant correlation between anoxia and increased pulmonary artery pressure. In their opinion, anoxia is of definite importance in the genesis of pulmonary hypertension. When intermittent oxygen therapy is not utilized to combat chronic anoxia, other approaches to the problem would include:

1. Improving air-flow dynamics and intrapulmonary mixing of gases by mechanical and pharmacologic means.

2. Effecting further control of situations and activities that aggravate the degree of hypoxia.

3. Investigating biological and mechanical means whereby oxygen storage capacity can be improved. Nature has provided man with the capacity for storing a 40-day supply of carbon compounds from which energy and building materials for cellular activity can be derived. However, should the flow of fresh oxygen be cut off from the arterial blood, man has but a four-minute supply of oxygen with which to burn this bountiful harvest of stored carbon compounds.

CONCLUSIONS

Arterial hypoxemia did not correlate closely with the degree of disability or with tolerance to exercise in patients with pulmonary emphysema. The individual patient with either slight or severe disability may have a normal arterial oxygen saturation. These results indicate that the severity of disability in a case of emphysema cannot be judged by knowing only the status of arterial oxygen saturation.

The presence of congestive failure in cor pulmonale was almost entirely limited to patients with hypoxemia. The incidence was greatest in those patients with persistent (resting) hypoxemia.

SUMMARY

A study was made to determine the correlation between the degree of disability and arterial hypoxemia in 100 consecutive patients with chronic obstructive pulmonary emphysema. The diagnosis in each case was based on combined clinical findings

and pulmonary function studies. The patients were classified in four groups according to an estimation of the severity of disability based on statements made during the interview for clinical history. Except for slight modification, the criteria established by the New York Heart Association for profiling functional capacity, or disability severity, were utilized.

A continuous-recording ear-lobe oximeter was used to determine arterial oxygen saturation. Periodic checks of the oximeter readings were made against samples of arterial blood analyzed by manometric technic.

Poor correlation was found between arterial hypoxemia and the clinical profile of disability severity, indicating that disability cannot be assessed solely on the basis of the degree of arterial oxygen saturation. The importance of arterial hypoxemia on hemodynamics in the pulmonary circulation is discussed, and certain approaches to the problem are suggested.

REFERENCES

1. Miller, R. D.; Fowler, W. S.; and Helmholz, H. F., Jr.: Relationship of arterial hypoxemia to disability and to cor pulmonale with congestive failure in patients with chronic pulmonary emphysema. *Proc. Staff Meet. Mayo Clin.* 28: 737-743, Dec. 30, 1953.
2. Ornstein, G. G.: New approach to understanding of pulmonary emphysema; method of determining emphysema of lungs. *Quart. Bull. Sea View Hosp.* 9: 89-136, Apr. 1947.
3. Jacobs, S.: Pulmonary emphysema: clinical forms. *Am. Pract. & Digest. Treat.* 2: 681-685, Aug. 1951.
4. Massey, F. C.: Physiologic basis of pulmonary disease. In Pullen, R. L. (editor): *Pulmonary Diseases.* Lea & Febiger, Philadelphia, Pa., 1955. p. 27.
5. Wilson, R. H. (Minneapolis); Borden, C. W.; and Ebert, R. V.: Adaptation to anoxia in chronic pulmonary emphysema. *A. M. A. Arch. Int. Med.* 88: 581-590, Nov. 1951.
6. Friedberg, C. K.: *Diseases of the Heart.* W. B. Saunders Co., Philadelphia, Pa., 1956. p. 157.
7. Wood, E. H., and Geraci, J. E.: Photoelectric determination of arterial oxygen saturation in man. *J. Lab. & Clin. Med.* 34: 387-401, Mar. 1949.
8. Riley, R. L.; Proemmel, D. D.; and Franke, R. E.: Direct method for determination of oxygen and carbon dioxide tensions in blood. *J. Biol. Chem.* 161: 621-633, Dec. 1945.
9. Van Slyke, D. D., and Neill, J. M.: Determination of gases in blood and other solutions by vacuum extraction and manometric measurement. *J. Biol. Chem.* 61: 523-573, Sept. 1924.
10. Baldwin, E. deF.; Cournand, A.; and Richards, D. W., Jr.: Pulmonary insufficiency; physiological classification, clinical methods of analysis, standard values in normal subjects. *Medicine* 27: 243-278, Sept. 1948.
11. Woolf, C. R.; Gunton, R. W.; and Paul, W.: Simple tests of respiratory function using direct-writing ear oximeter. *Am. Rev. Tuberc.* 74: 511-532, Oct. 1956.
12. Fry, D. L.; Ebert, R. V.; Stead, W. W.; and Brown, C. C.: Mechanics of pulmonary ventilation in normal subjects and in patients with emphysema. *Am. J. Med.* 16: 80-97, Jan. 1954.
13. Riley, R. L.: Work of breathing and its relation to respiratory acidosis. (Editorial) *Ann. Int. Med.* 41: 172-176, July 1954.
14. Van Lingen, B., and Whidborne, J.: Oximetry in congenital heart disease with special reference to effects of voluntary hyperventilation. *Circulation* 6: 740-748, Nov. 1952.
15. Hurst, A.; Dressler, S. H.; and Denst, J.: Relationship between pathological

changes in blood vessels in resected lobes and lungs as correlated with pulmonary artery pressure changes recorded during cardiac catheterization. *Dis. Chest* 24: 41-48, July 1953.

16. Lewis, B. M., and Gorlin, R.: Effects of hypoxia on pulmonary circulation of dog. *Am. J. Physiol.* 170: 574-587, Sept. 1952.

17. Zimmerman, H. A.: Study of pulmonary circulation in man. *Dis. Chest* 20: 46-47, July 1951.

18. Yu, P. N. G.; Lovejoy, F. W., Jr.; Joos, H. A.; Nye, R. E., Jr., and McCann, W. S.: Studies of pulmonary hypertension; pulmonary circulatory dynamics in patients with pulmonary emphysema at rest. *J. Clin. Invest.* 32: 130-137, Feb. 1953.

19. Bierman, H. R.: Pulmonary circulation times with particular relationship to acute hypoxia. *Am. J. M. Sc.* 222: 162-173, Aug. 1951.

REHABILITATION OF THE CARDIAC PATIENT

"The process of rehabilitation begins at the moment the patient is first stricken with his disease. The goal is the maximal attainment within the patient's capacities. In approximately 80 per cent of cardiac patients the total program can be managed by the private physician; in others, a team approach and help from specialists is necessary. It is assumed that adequate attention has been given to medical therapy, rest, relief of pain, oxygen requirements, nutrition, and sedation. In addition, the patient's emotional problems must be dealt with. The period of passivity which is frequently required at first should be terminated as soon as possible. The periods of hospitalization and of convalescence at home are followed by a period of vocational readjustment, and each presents problems that can be solved on the basis of available facts. There has been no evidence that employment has aggravated the underlying disease in cardiac patients, and there have been no medicolegal compensation cases involved in the employment of such patients."

—HERMAN K. HELLERSTEIN, M. D.
in *Journal of American Medical Association*
p. 225, May 18, 1957

JELLYFISH STINGS AND THEIR MEDICAL MANAGEMENT

BRUCE W. HALSTEAD, *Lieutenant Commander, MC, USNR*

STINGS from jellyfishes and related coelenterates are of frequent occurrence among swimmers, fishermen, and skin divers. Because of the nature of their activities, jellyfish stings are not uncommon among naval personnel. Fortunately, most coelenterate stings are mild in nature, and cause only minimal discomfort to the victim. In rarer instances they can produce serious injury, and on occasion sudden death. The purpose of this article is to discuss the medical significance of certain coelenterates that are considered to be especially dangerous to man, and the medical management of their stings.

CLASSIFICATION

The phylum Coelenterata, in which are grouped hydroids, jellyfishes, sea anemones, and corals, consists of simple metazoans having primary radial, biradial, or radiobilateral symmetry. They are composed essentially of two epithelial layers and but one internal cavity, the gastrovascular cavity or coelenteron, which opens only by the mouth. A dominant character of the group is the presence of tentacles equipped with nematocysts, or "stinging cells." The phylum Coelenterata generally is divided into three classes:

Hydrozoa (the hydroids)

To this class belong the hydroids that are commonly found growing in plumelike tufts on rocks, seaweeds and pilings. Small medusae are budded from these branching polyps. One of the most common stinging members of this group is *Physalia,* the Portugese-man-of-war, which is a pelagic colonial medusa.

Scyphozoa (the jellyfishes or true medusae)

This class includes the larger medusae having eight notches

From U. S. Naval Medical School, National Naval Medical Center, Bethesda, Md. This research was aided by a contract payment to the School of Tropical and Preventive Medicine, College of Medical Evangelists, Loma Linda, Calif., from the School of Aviation Medicine, U. S. Air Force, Randolph Air Force Base, Tex., and a grant from the U. S. Public Health Service.

in the margin of their bell. The deadly cubomedusae or sea wasps, *Chiropsalmus* and *Carybdea,* are examples of this class.

Anthozoa (the sea anemones, corals, and alcyonarians or soft corals)

The medusan stage is absent in this group, and many of the polyps are colonial. The corals are notable for their precipitation of calcareous skeletal structures and their role as reef builders. Important venomous examples are the anemones, *Sagartia, Actinia,* and *Anemonia.*

COELENTERATES ESPECIALLY DANGEROUS TO MAN

Hydrozoans

Millepora alcicornis Linnaeus—stinging coral, false coral, fire coral (fig. 1). Tropical Pacific, Indian Ocean, Red Sea, and Caribbean Sea.

Figure 1. **Millepora alcicornis *Linnaeus—stinging coral.***

Physalia physalis (Linnaeus)—Portugese-man-of-war, blue bottle (fig. 2). Tropical Atlantic, occasionally as far north as the Bay of Fundy, the Hebrides, and Mediterranean Sea.

Physalia utriculus (La Martiniere)—Portugese-man-of-war, blue bottle. Indo-Pacific, as far north as southern Japan, and Hawaiian Islands.

Figure 2. Physalia physalis *(Linnaeus)—Portugese-man-of-war.*

Scyphozoans

Carybdea alata Reynaud—sea wasp (fig. 3). Tropical Pacific, Atlantic Ocean, and Indian Ocean.

*Chironex fleckeri** Southcott—Queensland and Northern Territory, Australia.

*Chiropsalmus quadrigatus** Haeckel—sea wasp (fig. 4). Northern Australia, Philippines, and Indian Ocean.

Chiropsalmus quadrumanus (Müller)—sea wasp (fig. 5). Atlantic from Brazil to North Carolina, Indian Ocean, and northern Australia.

*C. *fleckeri* and *C. quadrigatus* may be the same species.

444645 O - 57 - 3

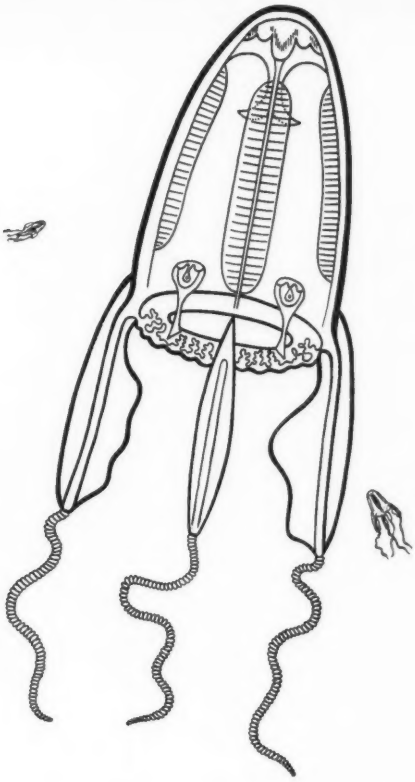


Figure 3. Carybdea alata *Reynaud—sea wasp.*

Cyanea capillata (Linnaeus) (fig. 6)—sea blubber, hairy stinger, sea nettle. North Atlantic and Pacific, southern coast of New England to the Arctic Ocean, France to northern Russia, Baltic Sea, Alaska to Puget Sound, Japan, and China. Other stinging species of this genus are found in the tropical and temperate Pacific Ocean.

Dactylometra quinquecirrha Desor—sea nettle (fig. 7). Azores and New England to the tropics, West Africa, Indian Ocean, western Pacific from Malay Archipelago to Japan, and Philippines.

Anthozoa

Acropora palmata (Lamarck)—elk horn coral. Florida Keys, Bahamas, and West Indies.

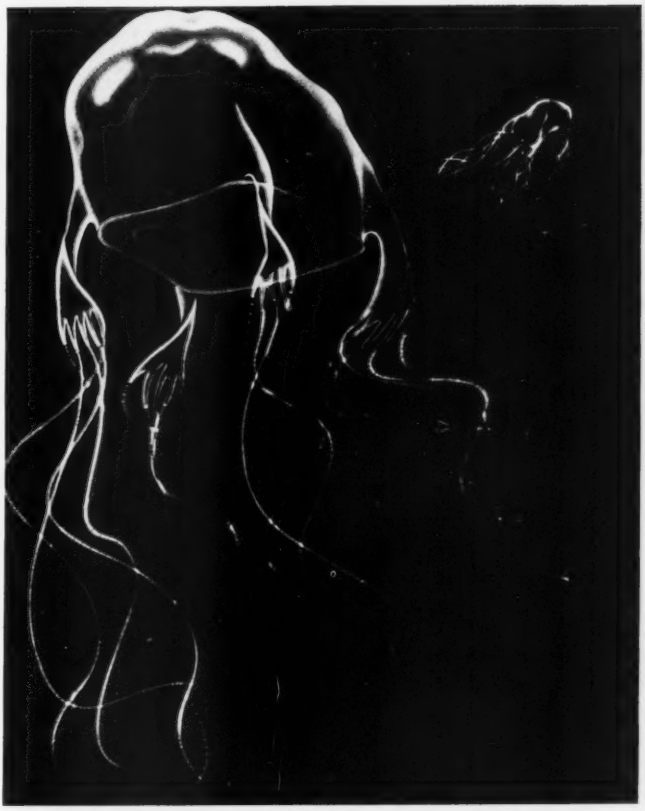


Figure 4. Chiropsalmus quadrigatus *Haeckel—sea wasp.*

Actinia equina Linnaeus—sea anemone (fig. 8). Eastern Atlantic from Arctic Ocean to Gulf of Guinea, Mediterranean Sea, Black Sea, and Sea of Azov.

Anemonia sulcata (Pennant)—sea anemone (fig. 9). Iceland to Atlantic coast of France, Mediterranean Sea, and coast of Africa.

VENOM APPARATUS OF COELENTERATES

The venom apparatus of coelenterates consists of nematocysts, or stinging cells. The term stinging cell actually is a misnomer, however, inasmuch as the structure is not a cell, but rather an organoid that is thought to be composed of chiton (fig. 10). Nematocysts usually are most abundant on tentacles, grouped on protuberances and circular or spiral ridges. They also are

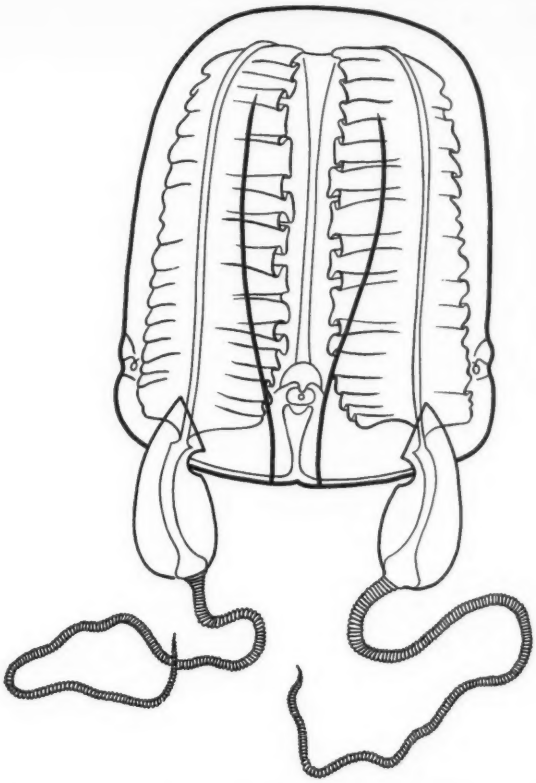


Figure 5. Chiropsalmus quadrumanus *(Müller)—sea wasp.*

found in the epidermis of the oral region, and on internal tentaclelike structures; *i. e.*, the gastric filaments, the septal filaments, and the acontia. Nematocysts initially develop inside interstitial cells, termed cnidoblasts or nematocytes. The developmental site of the nematocyst is usually some distance from the region in which it is finally utilized. Transportation of the cnidoblasts containing developing nematocysts is by ameboid movement through the body wall or by way of the gastrovascular cavity to their final destination in the ectodermal epithelium.

The essential features of the nematocyst apparatus are as follows: The capsule-like nematocyst is contained within the outer cnidoblast, which is fixed in the epidermis by a slender stalk connecting with the mesogloea. Projecting at one point on the outer surface of the cnidoblast is the triggerlike cnidocil.

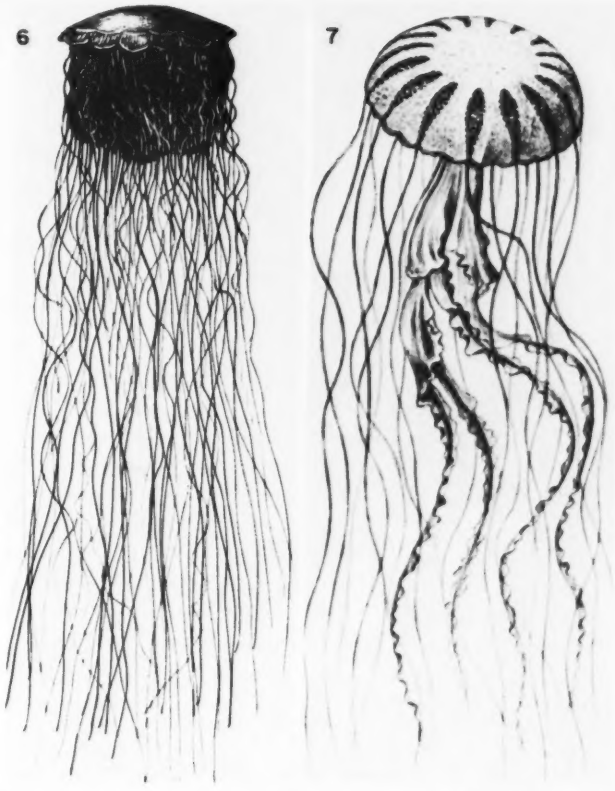


Figure 6. Cyanea capillata *(Linnaeus)—sea blubber. Figure 7.* Dactylometra quinquecirrha *Desor—sea nettle.*

Near the base of the cnidocil, in the periphery of the cnidoblast, there usually is found a circlet of stiff rods, probably of a supporting nature, and frequently a basketwork of sinuous fibrils that extend down into the stalk of the cnidoblast. Contained within the fluid-filled capsule is the hollow, coiled, thread tube containing the folded spines. The opening through which the thread tube is everted is closed prior to discharge by a lidlike device called the operculum. The fluid within the capsule is the venom. Stimulation of the cnidocil appears to produce a change in the capsular wall of the nematocyst causing the operculum to spring open and the thread tube to evert (fig. 11). The exact nature of the mechanism is not understood.

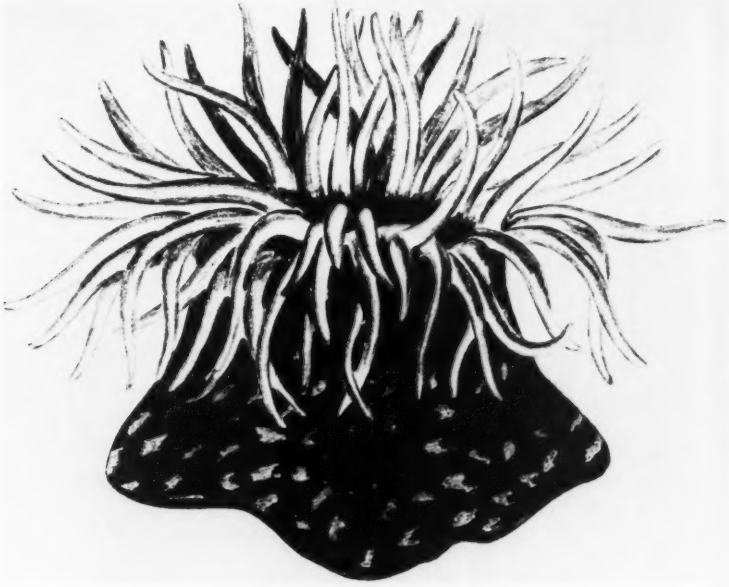


Figure 8. Actinia equina *Linnaeus—sea anemone.*

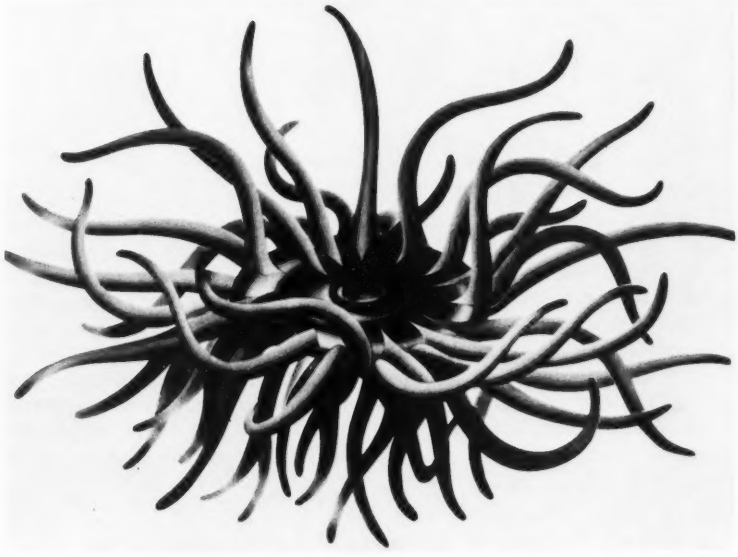


Figure 9. Anemonia sulcata *(Pennant)—sea anemone.*

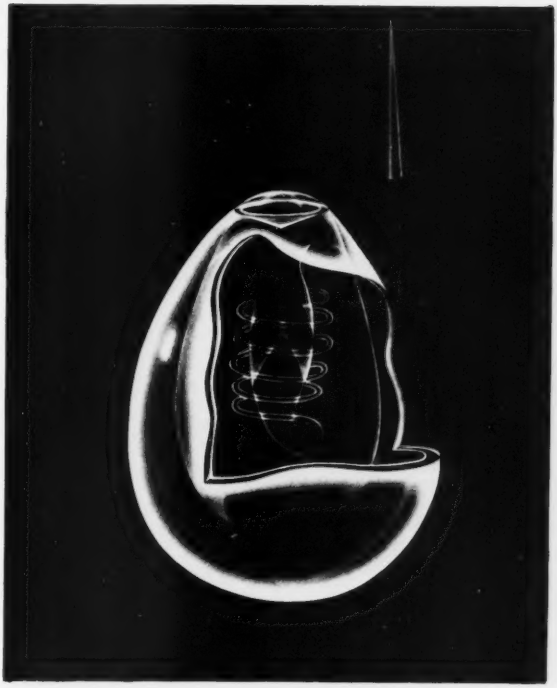


Figure 10. Undischarged stinging cell or nematocyst of a coelenterate. Note the coiled threadlike tube which conveys the venom. (Semidiagrammatic, greatly enlarged)

MEDICAL ASPECTS

There are no accurate statistics regarding the incidence of jellyfish stings among American military personnel, but Southcott[1] stated that while serving as regimental medical officer to a battalion attached to an Australian beach group at Palm Beach, north of Cairns, Queensland, during the period from December 1943 to January 1944, there were about 100 persons stung by jellyfish. One would assume from this that the over-all incidence is probably quite high. Unfortunately, there is even less information available regarding other types of coelenterate stings.

Clinical Characteristics

The symptomatology of coelenterate stings varies according to the species, the site of the sting, and the person. In general, the symptoms produced by hydroids and hydroid corals are primarily local skin irritations. Sea anemones and true corals produce a similar reaction, but this may be accompanied by general

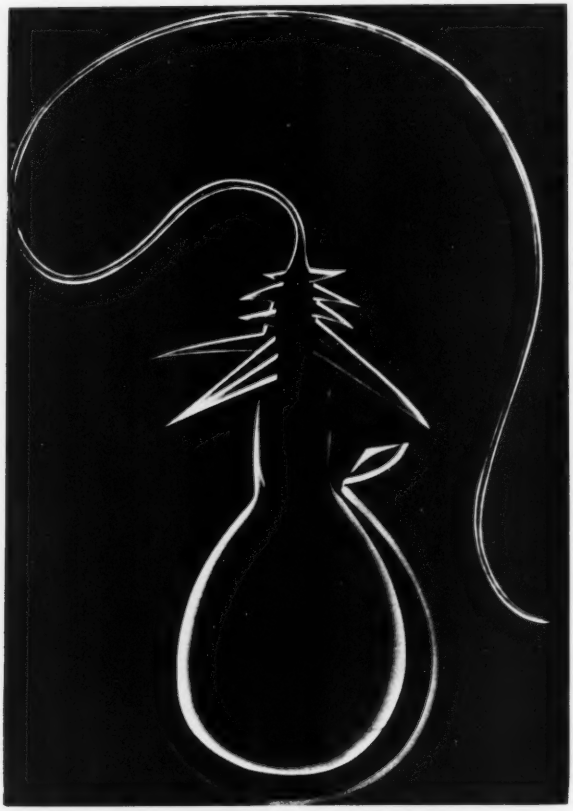


Figure 11. The discharged stinging cell or nematocyst of a coelenterate. (Semidiagrammatic, greatly enlarged)

symptoms. Ulcerations of the skin may be severe in the sponge-fishermen's disease produced by *Sagartia.* Symptoms resulting from siphonophores and scyphozoans vary greatly. *Physalia* stings may be very painful. The sting of most scyphozoans is too mild to be noticeable, whereas *Cyanea, Dactylometra, Chiropsalmus,* and *Chironex* are capable of inflicting very painful local and generalized symptoms. *Chiropsalmus* and *Chironex* are probably the most venomous marine organisms known and may produce death within 3 to 8 minutes in man.[1-4]

Contact with the tentacles of coelenterates results in symptoms ranging from an immediate mild prickly or stinging sensation like that of a nettle sting to an intense burning, throbbing, or shooting pain which may render the victim unconscious.

In some cases the pain is restricted to an area within the immediate vicinity of the contact. In others it may radiate to the groin, abdomen, or axilla, depending on the initial site of the lesion, or it may become somewhat generalized. The localized pains may be followed by a feeling of numbness or, sometimes, hyperesthesia. The area coming in contact with the tentacles usually becomes erythematous. This is followed by pronounced urticaria, blistering, swelling, and petechial hemorrhages. In sponge-fishermen's disease there may be a rash that becomes cyanotic, followed by multiple abscesses, necrosis, and sloughing of the tissues. Jellyfish may cause redness and flushing of the face, increased perspiration, lacrimation, coughing, sneezing, and rhinitis. An asthmatic-like condition has been reported as a result of inhaling dust containing dried jellyfish tentacles.[9]

The above-mentioned signs and symptoms may be accompanied by headache, malaise, primary shock, collapse, faintness, pallor, weakness, cyanosis, nervousness, hysteria, chills, and fever. In severe cases there may be muscular cramps, abdominal rigidity, diminished tactile and temperature sensation, nausea, vomiting, backache, aphonia, frothing at the mouth, sensation of constriction of the throat, respiratory distress, paralysis, delirium, convulsions, opisthotonos, cardiac standstill, and death.

The recovery period varies from a few hours to several weeks. Gunn[10] reported a case in which there was complete disappearance of the subcutaneous fat in the vicinity of the lesion. Stings from coelenterates may result in developing a sensitivity to the toxin, and a subsequent sting may produce a fatal anaphylactic reaction. An important factor in jellyfish-sting fatalities is primary shock and subsequent drowning before the victim can be rescued.

The following case report is representative of the more severe types of coelenterate stings.

CASE REPORT

A six-year-old Filipino boy was swimming in about 2 feet of water at Camantilis, Hundred Islands National Park, Pangasinan, Luzon. His sudden piercing screams brought several men running to his rescue. One of the men found a jellyfish by the side of the boy. Within moments the child was picked up and rushed to his home, which was within 10 yards of the seashore. He was found to be frothing at the mouth, and his respiration was spasmodic. His arms appeared to be partially paralyzed. There were large, irregularly shaped, dark-brown welts on his chest, arms, and neck, wherever the tentacles of the jellyfish had come in contact with his body. In less than five minutes after his rescue the child died. After his death his face, neck, and arms became severely swollen.

The jellyfish measured about 6 inches in diameter, with tentacles four feet in length. The organism was later identified by some of the local authorities as *Chiropsalmus quadrigatus* Haeckel.

Treatment

A variety of measures have been suggested for the therapeutic management of coelenterate stings. Treatment must generally be directed toward accomplishing three primary objectives: relieving pain, alleviating neurotoxic effects, and controlling primary shock. Morphine sulfate has been found to be effective in relieving pain. Intravenous injections of calcium gluconate have been recommended for the control of muscular spasms. Histaminics by mouth and topical cream are useful in treating the urticarial lesions. Dilute ammonium hydroxide, sodium bicarbonate, olive oil, sugar, ethyl alcohol, and other types of soothing lotions have been used with varying degrees of success. Artificial respiration, cardiac and respiratory stimulants, and other forms of supportive measures may be required. The use of steroids also has been suggested. There are no known specific antidotes for coelenterate venoms.

Preventive Measures

Particular care should be exercised by bathers swimming in areas in which dangerous coelenterates, especially the cubomedusae, *Chiropsalmus, Chironex, Carybdea,* and *Physalia,* are known to exist. It should be kept in mind that the tentacles of some species may trail a great distance from the body of the animal; consequently, they should be given a wide berth. Tight-fitting, long, woolen underwear or rubber skin diving suits are useful in affording protection from attacks from these creatures. Jellyfish washed up on the beach, even though appearing dead, may be quite capable of inflicting a serious sting. The tentacles of some jellyfish may cling to the skin. Care should be exercised in the removal of the tentacles, or additional stings will be received. Use a towel, rag, seaweed, stick, or handful of sand. Swimming soon after a storm in tropical waters in which large numbers of jellyfish were previously present may result in multiple severe stings from remnants of damaged tentacles floating in the water. Upon being stung the victim should make every effort to get out of the water as soon as possible because of the danger of drowning. Diluted ammonia and alcohol should be applied, and other therapeutic measures should be instituted as promptly as possible.

Since coral cuts are frequently associated with coral stings, a few remarks regarding these lesions are pertinent to the general subject. Anyone handling or wading around corals soon suffers from their sharp traumatogenic exoskeletons.

If coral cuts are left untreated, a mere scratch may within a few days become an ulcer with a septic sloughing base surrounded by a painful zone of erythema. In general, the symptoms appear to be far in excess of the visible lesions present. The severity of coral cuts is probably due to a combination of factors: laceration of tissues, introduction of foreign substances into the wound, *i. e.*, minute bits of calcium carbonate from the animal's exoskeleton and possibly nematocyst venom, secondary bacterial infection, and adverse climatic and living conditions. Treatment consists of prompt cleansing of the wound, removal of foreign particles, débridement if necessary, and the application of antiseptic agents. In severe cases it may be necessary to give the patient bed rest with elevation of the limb, kaolin poultices, magnesium sulfate in glycerin solution dressings, and antibiotics.[11-13] Levin and Behrman[14] found roentgen therapy to be useful in resolving a chronic coral ulcer with keloidal formation.

TOXICOLOGY

The venom of coelenterates is believed to contain three toxic fractions.

Thalassin

According to Richet,[15-22] Pawlowsky,[23] and Maass,[26] intravenous injection of this fraction into dogs was found to produce sneezing, pruritus, urticaria, genital excitation, vasodilatation, edema of the face, nervousness, redness, coughing, rhinitis, rolling on the ground, conjunctivitis, nervous depression, cardiac arrest, and death. Thalassin is especially characterized by its pruritogenic properties. The lethal dose in dogs is said to be 0.02 gram per kg. Thalassin was first obtained from the tentacles of *Anemonia sulcata,* but is believed to be present in most other coelenterates.

Congestin

According to Richet[16, 20-21, 24-27] Pawlowsky, and Maass,[26] intravenous administration of the poison into dogs resulted in vomiting, bloody diarrhea, evidence of abdominal pain, prostration, decrease in blood pressure, intense splanchnic vasodilatation, respiratory paralysis, and death. Congestin received its name because of the characteristic intense splanchnic congestion that it produces. The lethal dose in dogs is said to be 0.005 gram per kg of animal weight. This drug was likewise first obtained from the tentacles of *Anemonia sulcata.* Dujarric de la Riviere[29] isolated a substance from the tentacles of the jellyfish, *Rhizostoma cuvieri,* which he termed medusocongestin; however, it is believed to be identical with congestin.

Hypnotoxin

This substance is characterized by producing a central nervous system depression affecting both motor and sensory elements. Symptoms most commonly encountered are inactivity, coma, muscular paralysis, and cutaneous anesthesia when injected intramuscularly into laboratory animals. Death was reported from respiratory paralysis, but the lethal dose is not known. Hypnotoxin was first obtained by Portier and Richet[30, 31] from the tentacles of *Physalia*.

CHEMISTRY

Richet[17-19, 27] distinguished between thalassin and congestin on the basis of difference in solubility in alcohol. Ackermann, Holtz, and Reinwein[32] investigated the problem of the structure of coelenterate venom and believed it to be identical with tetramethylammonium hydroxide. Proof of identity was said to be in the coincidence of certain physical properties of a number of derivatives of the toxin as compared to the properties of the same derivatives prepared from this quaternary base. The question that remains is whether all of the physiologic properties ascribed to thalassin can be accounted for in terms of tetramethylammonium hydroxide. A subsequent study by Sonderhoff[33] did not provide an answer to this question. More recently Welsh[34] has reported that the pain-producing factor in coelenterate tentacle extracts is probably serotonin (5-hydroxytryptamine), whereas paralysis could be due to two or more related quaternary ammonium bases such as tetramethylammonium and urocanylcholine.

According to Portier and Richet[30, 31] hypnotoxin is believed to be a heat-sensitive, nondialyzable toxin with protein properties. Crutchfield[35] corroborated the heat sensitivity of the toxin and observed that it was digestible by trypsin. Little else is known about the chemistry of these interesting venoms.

SUMMARY

Stings from jellyfishes and related coelenterates are of frequent occurrence among persons swimming in tropical waters. The venom apparatus of coelenterates consists of the nematocysts or "stinging cells" that are largely located on their tentacles. The symptomatology of coelenterate stings varies according to the species, the site of the sting, and the person. Deaths from some species of jellyfish may occur within 3 to 8 minutes. Morphine sulfate, calcium gluconate, histaminics by mouth, and various soothing lotions have been used in the treatment of these stings with varying degrees of success. Coelenterate venom is believed to be comprised of three basic fractions, which have been called thalassin, congestin, and hypnotoxin. The principal

effects produced are pruritus, vasocongestion, and central nervous system depression, respectively. Little is known regarding the chemistry of the venoms. It is believed, however, that the pain-producing factor is probably serotonin (5-hydroxytryptamine), whereas paralysis may be due to two or more related quaternary ammonium bases such as tetramethylammonium and urocanylcholine. The dearth of reliable scientific data on this subject suggests the need for additional research on coelenterate venoms.

ACKNOWLEDGMENTS: The author is indebted to Mr. Claro Martin, Chief, Fisheries Research Division, Bureau of Fisheries, Republic of the Philippines, for the case report; to Dr. Donovan Courville and Mr. Don R. Coe, School of Medicine, College of Medical Evangelists, for the summarization on coelenterate venom; and to Mr. Robert Kreusinger, College of Medical Evangelists, for the preparation of the illustrations.

REFERENCES

1. Southcott, R. V.: Studies on Australian cubomedusae, including new genus and species apparently harmful to man. *Australian J. Marine & Freshwater Research* 7: 254-280, July 1956.

2. Light, S. F.: Some Philippine Scyphomedusae, including two new genera, five new species, and one new variety. *Philippine J. Sc.* Ser. D, 9: 195-231, June 1914.

3. Light, S. F.: Another dangerous jellyfish in Philippine waters. *Philippine J. Sc.* Ser. B, 9: 291-295, 1914.

4. Wade, H. W.: Post-mortem findings in acute jelly-fish poisoning with sudden death in status lymphaticus. *Am. J. Trop. Med.* 8: 233-241, May 1928.

5. McNeill, F. A., and Pope, E. C.: Venomous medusae from Australian waters. *Australian J. Sc.* 5: 188-191, June 1943.

6. McNeill, F. A., and Pope, E. C.: Deadly poisonous jellyfish. *Australian Museum Mag.* 8: 127-131, Apr.-June, 1943.

7. McNeill, F. A.: Injuries by unknown agents to bathers in North Queensland. *M. J. Australia* 2: 29, July 7, 1945.

8. Flecker, H.: Fatal stings to North Queensland bathers. *M. J. Australia* 1: 35-38, Jan. 12, 1952.

9. Fish poisons. (Notes and Comments section) *U. S. Nav. M. Bull.* 20: 466-467, Apr. 1924.

10. Gunn, M. A. R.: Localized fat atrophy after jelly-fish sting. *Brit. M. J.* 2: 687, Sept. 24, 1949.

11. Paradice, W. E. J.: Injuries and lesions caused by bites of animals and insects. *M. J. Australia* 2: 650-652, Dec. 20, 1924.

12. Byrne, K.: Coral cut. *M. J. Australia* 2: 649-650, Dec. 20, 1924.

13. Preston, F. S.: Coral ulcer. *Brit. M. J.* 1: 642-644, Mar. 18, 1950.

14. Levin, O. L., and Behrman, H. T.: Coral dermatitis. *Arch. Dermat. & Syph.* 44: 600-603, Oct. 1941.

15. Richet, C.: Du poison pruritogène et urticant conenu dans les tentacules d'Actinies. *Compt. rend. Soc. de biol.* 54: 1438-1440, Dec. 13, 1902.

16. Richet, C.; Perret, A.; and Portier, P.: Des propriétés chimiques et physiologiques du poison des Actinies (actinotoxine). *Compt. rend. Soc. de biol.* 54: 788-790, June 28, 1902.

17. Richet, C.: Des poisons contenus dans les tentacules des Actinies (Congestine et thalassine). *Compt. rend. Soc. de biol.* 55: 246-248, Feb. 21, 1903.

18. Richet, C.: De la thalassine, toxine cristallisée pruritogène. *Compt. rend. Soc. de biol.* 55: 707-710, June 6, 1903.

19. Richet, C.: De la thalassine, considérée comme antitoxine cristallisée. *Compt. rend. Soc. de biol.* 55: 1071-1073, July 25, 1903.

20. Richet, C.: Des effets prophylactiques de la thalassine et anaphylactiques de

la congestine dans le virus des actinies. *Compt. rend. Soc. de biol.* 56: 302-303, Feb. 20, 1904.

21. Richet, C.: Nouvelles expériences sur les effets prophylactiques de la thalassine. *Compt. rend. Soc. de biol.* 56: 775-777, May 7, 1904.

22. Richet, C.: De la thalassine pruritogene chez les crevettes *(Crangon). Compt. rend. Soc. de biol.* 56: 777-778, May 7, 1904.

23. Pawlowsky, E. N.: *Gifttiere und ihre Giftigkeit.* Gustav Fischer, Jena, Germany, 1927.

24. Richet, C.: Des effets anaphylactiques de l'actinotoxine sur la pression artérielle. *Compt. rend. Soc. de biol.* 54: 837-838, July 5, 1902.

25. Richet, C.: De l'action de las congestine (virus des Actinies) sur les lapins et de ses effets anaphylactiques. *Compt. rend. Soc. de biol.* 58: 109-112, Jan. 21, 1905.

26. Richet, C.: De l'anaphylaxie après injections de congestine, chez le chien. *Compt. rend. Soc. de biol.* 58: 112-115, Jan. 21, 1905.

27. Richet, C.: Notizen über Thalassin. *Arch. f. d. ges. Physiol.* 108: 369-388, June 17, 1905.

28. Maass, T. A.: *Gift-tiere. Tabulae biologicae.* Edited by W. Junk. The Hague, 13: 1-272, 1937.

29. Dujarric de la Rivière, R.: Sur l'existence d'une méduso congestine. *Compt. rend. Soc. de biol.* 78: 596-600, Nov. 20, 1915.

30. Portier, P., and Richet, C.: Sur les effets physiologiques du poison des filaments pêcheurs et des tentacules des Coelentérés (hypnotoxine). *Compt. rend. Acad. d. Sc.* 134: 247-248, 1902.

31. Portier, P., and Richet, C.: De l'action anaphylactique de certains venins. *Compt. rend. Soc. de biol.* 54: 170-172, 1902.

32. Ackermann, D.; Holtz, F.; and Reinwein, H.: Reindarstellung und Konstitutionsermittelung des Tetramins, eines Giftes aus Aktinia equina. *Ztschr. f. Biol.* 79: 113-120, 1923.

33. Sonderhoff, R.: Über das Gift der Seeanemonen. *Ann. d. Chem.* (Liebig's) 525(2-3): 138-150, 1936.

34. Welsh, J. H.: On nature and action of coelenterate toxins. Pap. Mar. Biol. Oceanogr., *Deep-Sea Research* Suppl. 3: 287-297, 2 figs., 3 tabs., 1955.

35. Crutchfield, E. D.: Dermatitis produced by Portugese Man-of-war. *Arch. Dermat. & Syph.* 12: 72-75, July 1925.

IMPAIRMENT FROM ALCOHOL

"The effects of alcohol vary with individual tolerance and length of usage. In an individual of average weight, two ounces of whiskey are enough to produce a blood alcohol level of 0.05 percent—an amount sufficient to produce an average impairment of 25 percent. Alcohol is eliminated from the blood at the rate of about one-third of an ounce per hour. Physiological impairments thus are likely to last for hours, depending on the amount consumed."

—MORRIS S. SCHULZINGER, M. D.
in *Industrial Medicine and Surgery*
p. 453, Oct. 1956

ICARUS AND THE PHYSICIAN

Reflections on Aircraft Accidents and Their Prevention

FRANK B. BERRY, *M. D.*

Daedalus and his son, Icarus, are two earliest recorded flyers. They were Athenians and went to the Island of Crete to build a labyrinth. Eventually, they themselves were inprisoned there. In order to escape, Daedalus made a pair of wings for each, which were held to the body by some form of wax. Daedalus warned his son Icarus not to get too near the sun as the wax would melt. They both escaped from the labyrinth, but Icarus did not obey his father's warning and, as a result of flying too high and getting too near the sun, he fell into the sea and drowned. Daedalus, on the other hand, arrived safely in Sicily. These are early examples of both faulty engineering, although Daedalus probably used the best materials that were available, and pilot failure in that Icarus did not obey the instructions of his father, the engineer, who knew of the weakness in the flying equipment which he had designed.

AT DUSK one evening some years ago I stood by the edge of a British air field in North Africa and watched the flight of bombers take off in exact precision, one after the other, for their evening bombing run. Except for enemy action there was never a thought but that they would all return safely to their base. There were no weather problems, the pilots and crews were well trained and maintenance was good. There was the will to cooperate and do the best job possible.

During the month of February 1956, we witnessed almost without comment, other than the factual recording of each, a sobering series of fatal airplane accidents for almost all of which there was no question of weather. To list a few, we had a B-52, two B-47s, a B-50, a Navy jet, a Marine transport, and chartered British Army transports in Egypt and Malta. In addition, we have had our own transport accidents in the past—the commercial, the larger military and chartered military planes—and here again frequently there was no question of bad weather. We are becoming

The second Louis H. Bauer Lecture. Presented April 16, 1956, at the 27th annual meeting of the Aero Medical Association, Chicago. Reprinted from *The Journal of Aviation Medicine* 27: 197-207, June 1956.

Dr. Berry is Assistant Secretary of Defense (Health and Medical), Washington, D. C.

calloused to fatal accidents involving our youth both by the automobile and the airplane, and the public is comparatively unaroused by them; yet I am sure that the parents and wives have wondered. Must we accept this increasing toll or can something be done about it?

In an informal report and also in recent testimony before Congress, I have deplored the fatalities incurred in routine training of pilots, crews and cadets, both in the Air Force and Naval Aviation. As I ponder this question it seems to me there are several causes involved. At the moment we can do something about some of them, although for the time being the others may be beyond our ken as are the new problems that are bound to arise from our rapid technological advances. In order to protect and preserve these young men, it is of the utmost importance that we exert every effort to minimize their loss, even when in so doing the chips may fall in some places where they hurt. I speak not only of military aviation but also of civilian, and although the problems are somewhat different in both, they are also similar.

THE BACKGROUND

As I have discussed in earlier addresses dealing with problems of personnel, we have been and still are in a period of short supply of manpower due to the decreased birth rate in the 1930 decade, and are only now beginning to approach the same monthly figure of boys turning eighteen years old as was the case in the mid-1940's. Within the next two or three years we shall exceed it and our pool of manpower will begin to mount rapidly. In a special report, "Some Figures That Startle the Cabinet" in the February *U. S. News and World Report*,[4] there is a summation of this situation: Army tests show that one in nine youths examined were too illiterate for the Armed Forces (11 per cent), and of those accepted for training one in every three examined were found to be unsuitable for advanced training (33.3 per cent), which decreases available manpower still further.

Although the number of graduates from our medical schools is increasing at a slightly higher rate than is our population, this comparison is only valid *per se*. It does not take into account the rapidly expanding demands of our changing civilization. In 1900, for example, our population was 76,000,000 and in 1950 it was 157,700,000, slightly more than double. You may think that this can be readily explained because of the rapid advances in preventive and therapeutic medicine and surgery during this half century, and there is no question but that these are extremely important contributing agents. But there are complicating factors, for during this same period our Negro population almost doubled from 8,800,000 in 1900 to 15,000,000 in 1950, and in the same fifty years well over 20,000,000 of the total increase in population was

due to immigration. So what would have happened to our intrinsic growth rate had the composition of the population remained unchanged after 1900 is open to speculation.

From an educational viewpoint, to quote President Griswold of Yale[11]:

> At any one time in this country between the years 1900 and 1950, there are (and this would have held true for any month in any year you might have taken the measurement) between ten and thirteen million foreign born with between fifteen and twenty-five million children, giving a total of between twenty-five and thirty-eight million foreign born citizens and their children.

To further confuse one, a similar increase in birth and decrease in death rates occurred during the 60 years of the reign of George III of England, from 1760 to 1820, when the population of Great Britain doubled. And this occurred in a small land area during a period of emigration rather than immigration. These were the early years of the industrial revolution and, although there were some general improvements in living, the only significant purposeful medical development was the introduction of vaccination against smallpox by Dr. Edward Jenner at the very end of the eighteenth century. Except for this, forward steps in preventive medicine were almost nil. Fortunately, however, and this may have been a real contributing factor, the plague which was prevalent in England in the fourteenth to seventeenth centuries had not reappeared in epidemic form since 1665.

During the years since World War II there has been an extraordinary demand for trained skills, an increase in the old and development of new ones. Consider if you will what has happened: the great expansion in our automobile, aircraft, and air conditioning and electric appliance industries. To these we have added television, radar and electronics, and our nuclear industries and research. Likewise, as you know, research has expanded enormously so that in 1952 it was estimated that 175,000 persons in this country were engaged in research, with an annual expenditure of about three and one-half billion dollars. From the medical standpoint alone, our total costs today are in the neighborhood of two hundred million dollars annually. In 1940 the Federal Government contributed twenty-five thousand dollars a year to the medical schools, whereas in 1954 its contribution was in the vicinity of fifty million dollars. We have to ask ourselves: what price research; yet constantly new avenues are opened which must be followed, first, for their own intrinsic worth, and second, because they in turn lead to new sources of information. It may be wrong, therefore, to accept the conclusion that as long as our group of medical graduates is increasing at a slightly greater rate than that of the general population, all is well; our

444645 O - 57 - 4

apparent and real shortages may not be entirely a matter of distribution.

In order to produce 2,800 qualified aviation cadets with two years or more of college education, an original pool of 800,000 young men is required. By the time these potential pilots reach the age of 40, the number of those remaining in the service is still further reduced.

THE PROBLEM

Today aviation is confronted with problems such as man has never had to cope with before. Lacking the emotional drive which existed in the war years a decade ago, has there been a letdown on our part which accentuates these problems in their stark reality?

I have mentioned the series of fatal aircraft accidents that occurred in a recent month, in almost all of which there was no mention of a weather factor. In a recent review of acceleration and human performance Brown and Lechner[5] cited as follows:

> Blockley has distinguished between two kinds of protection which must be afforded pilots. One he labels emergency protection. This is the kind of protection which is necessary for the preservation of life. It would include such items as oxygen supply for use in high altitude, a method of pressurization for use in extremely high altitudes, and ejection devices. The second kind of protection he calls basic protection. This includes all techniques and devices for the maintenance and improvement of pilot efficiency. Actually, with the present rate of development in aircraft, Blockley's basic protection is becoming more and more important for the preservation of life. The demands which are imposed on pilots are such that, unless they can maintain performance at the highest possible efficiency, their chances of survival are appreciably diminished. This is attested, indirectly at least, by the high percentage of aircraft accidents which are attributed to pilot error.
>
> According to Stieglitz: Pilot error is the most common cause of accidents.
>
> And Roscoe reports: Some pilot error exists in approximately 90 per cent of all aircraft accidents. It would seem that the efficiency of pilot performance has not kept pace with the increasing demands as aircraft are improved.

The knowledge of these demands is common to all of you, and as you accept "pilot error," the solution of the problem falls largely on the shoulders of the medical profession and its paramedical groups, and this includes first-class leadership and strict enforcement of regulations for our pilot personnel.

As we enter the zone of sonic and supersonic speeds in the upper stratosphere, the demands on that human organism known

as a pilot are almost beyond the realm of imagination. What the laity and those of the medical profession like myself, who are ill versed in these matters, take for granted are the problems which you and those engaged in those disciplines, known as human factors and environmental engineering, are trying to solve.

To pinpoint my thesis that there are simple precautions that we can take to improve our safety record, let me relate three episodes that have come to light. The first appeared in a service publication in a recent letter[2] from the commander to a major subordinate commander:

Reference is made to — Regulation 160-109, 28 August 1952, Medical Investigations of Aircraft Accident. It is noted that the provisions of this directive were not complied with in connection with this, as well as other undetermined fatal accidents involving — aircraft. Since the primary reason for investigating and reporting aircraft accidents is to determine the cause, and prevent recurrence of similar types, it is requested that all base commanders under your jurisdiction be advised of the importance of insuring compliance with this regulation.

Why should situations like this arise? Are we dropping our guard?

Another report[5] tells of an aircraft accident in which the fundamental cause was considered to be "supervisory error":

This accident was due to lack of appropriate action prior to the accident in connection with the condition of the senior mobile control officer. He was not present for duty and had the only pair of binoculars with him so that the junior mobile control officer was unable to note an unsafe condition of the nose wheel and notify the pilot. Medical information as to the senior mobile control officer revealed that he was hospitalized on that same day with an admission diagnosis of "alcholism, chronic, moderate, manifested by delirium tremens, stress unknown; moderate predisposition with long standing history of alcoholism; marked impairment." This officer was returned to flying status a few days later by his flight surgeon.

Third is an anonymous case report,[13] service and country not stated, in which a medical investigation of a fatal jet accident by a junior medical officer revealed as follows:

The dead pilot had trouble throughout his course of training and had just made the grade. Basically he was afraid of jet flying but was more afraid of admitting his fear, therefore, he had just squeaked by. The morning of his fatal accident, he arose with a bad hangover, vomited, ate no breakfast and reported for his formation flight. There was no medical check at that time. Further investigation revealed that he was frequently subject to screaming nightmares and in order to avoid these would often resort to excess alchol and go to bed moderately drunk.

This was his usual solace at the end of his day's flying. Result was loss of life; loss of an aircraft; impaired morale of his whole outfit. The problem was solved too late by investigation by a young medical officer; it could have been prevented.

You are all aware of the two unfortunate *Comet* disasters over the Mediterranean. Do all of you know that the etiology of these disasters was solved by an extraordinarily fine exhibition of medical intelligence, or detective work if you will. The medical findings were reported recently in the *Lancet*,[7] but unfortunately this truly beautiful and complete work was scarcely noticed in the American medical press. An almost identical account,[12] however, was printed in this country in a popular magazine in August, 1955. The first clue was gained by autopsies on the victims of the first accident. There it was found that all of the bodies exhibited unmistakable pathological evidence of explosive decompression. In order to verify this, animals were carried to the same height and explosively decompressed at an altitude of 30,000 feet. The pathological findings were identical. As you will recall, the fragments of the aircraft were dredged from the bottom of the Mediterranean, reconstructed, and the weakened area found above one of the windows at a seam which had blown out when the airplane reached the height of 30,000 feet.

METHODS OF SOLUTION

What are we doing about these problems in the Department of Defense at the present time?

First, under the leadership, guidance and inspiration of Wing Commander E. Bruce Harvey, RAF, Wing Commander R. T. Lowry, RCAF, and Dr. Howard T. Karsner, advisor in medical research for the Navy, an international Joint Committee on Aviation Pathology has been established by Great Britain, Canada and the United States.[3] It was my privilege to attend the first meeting which was held recently at the Armed Forces Institute of Pathology. Realizing what pathology had accomplished in furnishing the first clue as to the cause of the *Comet* failures, this committee will establish procedures for and accumulate material from the bodies of the victims in fatal accidents. This may include chemical analyses of blood or tissues, autopsies and histological examination of tissues, and medical examination of equipment and portions of the aircraft. We hope that other countries, as they may be interested, will co-operate with this committee and that our own Civil Aeronautics Administration may participate as they may be inclined to do so.

Second, for several years we have been sponsoring a program called Medical Education for National Defense, commonly known

as MEND. The origin of this program was in the committee appointed by the Association of American Medical Colleges in 1951. At first a test program was inaugurated in five medical schools, which met with a certain amount of success. Objections, however, were raised by the deans of a number of schools that attempts were being made to dictate portions of their curricula; this was considered to be unwarranted interference. In order to eliminate these objections, the program was reoriented two years ago, placed in the hands of a full-time administrator and offered to ten additional schools, on their own application, with the provision that an increased number of schools would be added each year as they desired and within the means of the funds provided.

At the present time there are twenty-five medical schools participating in this program. Only the faculties of the schools are involved. An organizer is appointed for each school and conferences are arranged in Washington and also in the field for the faculty members participating so that the problems of military medicine may be seen at first hand. The same faculty members do not necessarily participate in each trip but a selection is made so that each special group will be able to visit in its own discipline. Several trips or conferences are provided each year. In this manner the entire research and teaching programs of the military are made available to faculty members of our medical schools. It then rests with them how much they wish to incorporate into their courses. At the present time this program has created marked enthusiasm; as a matter of fact, more than we can keep pace with. We are already planning to include some of the dental schools and expect that some of the products of MEND will be passed on to paramedical groups through the medical and dental schools. In this manner we hope to imbue our new medical graduates with the seriousness and importance of the difficulties and various problems of necessary research which confront aviation today.

Third, the pattern of aviation is ever changing and to meet these growing demands some of our universities, both here and abroad, have instituted programs dealing with these problems. Notable among these is the well planned and complete course in aviation medicine recently instituted at the Harvard School of Public Health under Dr. Ross A. McFarland. Similar attention, though in more abbreviated form, is being given to this growing and important specialty in the College of Medicine of Ohio State University, at Johns Hopkins and at the University of California, Los Angeles, both in postgraduate and medical departments. These are in addition to the increasing growth and application of purely scientific knowledge in our great technical institutes. In addition to these there is the Flying Physicians Association, the aims of which are:

1. Education in aeromedical problems.

2. Encouragement of already licensed pilots to increase proficiency and win higher ratings.

3. More protective devices such as safety harnesses, "delethalized" instrument panels and crash resistant fuselages.

4. Better group airplane and accident insurance plans for the benefit of the membership.

5. Regular meetings to further the study of education.

Changes in or additions to the curricula of medical schools are difficult to make. There is so much to give and so little time. I suppose one might call this a natural resistance or inertia to the institution and growth of a new specialty, and tardiness in grasping its import and importance. Most young men go to medical school with the very natural desire of becoming doctors interested in treating patients. It might be of great interest to run a survey on any one class throughout its four years in medical school as to what branch of medicine interests each member on his way through school. There will be many changes in the opinions of those who reply, and in certain instances these same individuals may change their minds several times. Studies have already been made to show that an appreciable group of doctors change their localities and even their specialties during their lifetimes.

Both the Air Force and Navy, as is well known to all of you, have very high quality programs of training in aviation medicine on both the short term and long term basis. The short courses are intended for flight surgeons to meet their current needs and are primarily for those who are in the service for a short duration. The longer courses lead to full qualification as specialists in aviation medicine and certification by the American Board of Preventive Medicine.

Similarly some of the universities and technical schools abroad are constantly adding studies in all phases of aviation problems into their regular curricula. It is not too far fetched to say even that the extraordinary developments in hypothermia in recent years, and the vistas they have opened in the fields of cardiac and neurological surgery especially, were stimulated by aircraft flight into the higher altitudes and the stratosphere. Over fifteen years ago it was noted by students in aviation medicine that certain similarities existed between fatal cold injury and the fatalities occurring in flight at altitudes above 20,000 feet because of inadequate protection for the pilots. These observations on the part of reputable physiologists led to animal experimentation in this field and later to those studies in Germany on

the exposure of humans to immersion in water at temperatures between 2.3° and 12°C, and to dry cold carried out under the direction of S. Rascher, et al, in collaboration with Henrich Himmler.[5] In the original documents the reason for these experiments was stated to have been the desire to afford added protection for German flyers. The studies, made on prisoners from the concentration camp at Dachau, were ill-controlled. Some of the reports were rather fantastic, and the whole conception has been much condemned throughout the Western world as it was by reputable German scientists. Nevertheless, on perusal of the letters and reports made to Himmler, it was ascertained that associated with the group was a well-recognized German physiologist so that some factual observations were drawn from these experiments.

As we scan the economy of our various professions today, we see that physicians stand head and shoulders above the rest. The basic answer to this must be that at the moment demand exceeds supply. This is particularly noticeable in industrial and aviation medicine. As noted above, Harvard University has realized this in its recently instituted full-fledged course in aviation medicine in the School of Public Health.

Speaking purely from the military standpoint, our problem is serious. How can we interest our younger group of physicians today to carry forward the problems of aviation medicine and medical research like Lyster, Longacre, Armstrong, Benson and Fulton in the United States, for example? In times of peace and relative peace, there is not the emotional drive that is evident in war, and we see this on all sides today. Due to the pressure of ordinary clinical medicine and medical care, there is a dearth of qualified doctors in our military aviation. I recall particularly a flight surgeon on a carrier in the Southwest Pacific with approximately forty-five pilots under his care for a sixteen-month period during World War II, which naturally included periods of operational training, combat and rest. During this time no pilot was lost from crashes, although there were two fatalities of crew members. Granted that from the combat side this was partly a matter of good fortune and pilot skill, nevertheless from the care accorded the pilots and crews it demonstrates what a flight surgeon can do. During this period, incidentally, he discovered two cases of relative night blindness, or delayed dark adaptation, in pilots, both of whom had been sent to him as fit for full duty.

Again, on one of my recent visits I found two medical officers in the Air Force who refused to be distracted from their duties as flight surgeons by the ordinary care of patients. I asked them directly whether or not they would like to spend part of their time in the base hospital. They replied that they were not primarily

interested because their job was on the flight line with aviation personnel.

Whether in military or civilian aviation, the flight surgeon must be a devoted, courageous, interested, first-class doctor and psychologist, and also a man among his fellows. He must know and be willing to fly with each and every pilot under his charge and should have equally intimate knowledge of other members of the air crews. He must have full knowledge of them as individuals, of their personalities and of their families. He must be responsible for their physical and mental fitness at all times, which includes their diet, living quarters and recreation. With aviation of today and tomorrow demanding more and more of its human component, it becomes incumbent upon the doctor to assure the physical and mental fitness of those in his charge at all times. Likewise, his responsibilities extend further than just the pilot and co-pilot; they extend to all members of the crew and also to the maintenance group who contribute to the mechanical safety of the flight. The flight surgeon is likewise responsible for a large investment of human research, capital and material, and the lives of passengers entrusted to the charge of the aircraft commander in flight. By flying with his pilots the doctor may discover perhaps the reasons for bravado, uncertainty and indecision. In turn he must have the courage and firmness to recommend grounding a pilot or crew member when in his opinion they are not fit to fly a particular mission. This may require real courage to stand against both pilot and commanding officer or between them.

CIVIL AVIATION

There is a different aspect to commerical and airline flying. Whereas in military aviation the pilot is ordered to fly and may desire to fly, in civilian aviation it is his right to fly according to the terms of his employment, Futhermore, in civilian aviation the pilots are less under the guidance of flight surgeons than in military aviation. They and their families are a part of the community and in most instances have their own private physicians. The physician responsible for their fitness to fly, the safety of the passengers and the safety of the plane must extend his knowledge and tact in other directions. As in the military, he should know each one of his pilots, their personalities, their families and their problems. When his suspicions are aroused that something is amiss or when the pilot is ill, he must know how to enter the family situation and cooperate with the family physician who may know nothing whatsoever about the problems of aviation medicine. Here the art and ethics of the practice of medicine enter to their highest degree. If he and the family physician agree, then the problem is solved; if, however, a difference

of opinion arises, he must persuade the family physician of the necessity of a consultation with one or more specialists highly regarded in the profession and of unimpeachable integrity. Furthermore, on his own panel he must have available recognized specialists in the basic sciences as well as in all the specialties of clinical medicine. In the annual physical examinations or in examinations prior to the return to duty following an illness, there must be available every modern device for examination and testing. In civilian aviation this becomes particularly important now as we are about to shift to jet transports within the next few years. It is needless for me to tell you that this will mean new training programs for the great majority of our airline pilots, not to mention the necessary changes in many of our airports and in operational concepts.

Whereas in 1954 there were slightly over thirty-two million paying airline passengers, it is expected that by 1960 there will be fifty-five million, with paying passenger miles almost doubled.[1] This will mean not only additional pilots, but also additional flight surgeons.

It is good to see the increased emphasis on civil aviation medicine in the United States. The latest manifestation of this interest is the recently introduced bill (H. R. 10228), known as the Civil Aviation Medical Act of 1956, which provides for an Office of Civil Aviation Medicine within the framework of the Civil Aeronautics Administration, with a civil air surgeon and a Civil Aeronautics Medical Research Laboratory. In effect, these will be the civilian counterparts of offices and institutions found in the Armed Forces.

As planes become larger and speedier, and as the airways and airports become increasingly crowded, unless more and better controls are instituted, the fatality rate may well increase. More and more is required of the pilot. His instrument panel may grow larger and more complex. Every automatic device tends to decrease his sense of feel and his need to see. Unfortunately, however, with every automatic device there is ever present the possibility of failure, and with each added automatic check that is imposed to decrease that chance of failure, another possibility of failure arises; we can never get away from human error. It becomes our duty, therefore, to reduce both human and mechanical errors to a minimum.

HUMAN FACTORS TEAMS

Here we come to another important factor in accomplishing this. I am sure that all of you have had difficulty at one time or another in repairing some relatively simple part of your automobile engine, maybe perhaps just replacing a nut or bolt, and

in so doing you have appreciated an inexplicable difficulty as to why that nut or bolt could not have been placed more conveniently, or why perhaps did it have to be of a size or shape that could not be replaced readily. And if you have not had this experience yourself, you must have heared the cursing and muttering of various repairmen, and the suggestion that it would be a good idea if the engineers that designed the cars and their engines to catch the eyes of the public would spend more time in repairing them. So with the airplane.

When the former Research and Development Board was instituted, a committee of human relations and one of medical sciences were established. At times they overlapped and conflicted, but their individual importance and cooperation were well recognized. Since then the military has developed human factors research teams,[10] consisting of a team captain, a flight surgeon, an anthropologist, a physiologist, a psychologist and a biophysicist. These teams work with the engineers in planning the design of airplanes with the result "that significant improvements for crew effectiveness have been accomplished in the B-47, B-52 and F-86 type aircraft, through the combined efforts of the human factors teams and contractor and operational commands, at the same time that orderly integration has gone into the future systems."[10] Without the knowledge, thought and planning of these human factors teams it would be impossible for some of our planes to be operated with any degree of safety. They consider, for example, such problems as:

1. The optimum number and type of crew to perform the mission and the general operational requirement.

2. Are the altitudes required compatible with weight and space allocation from the environmental control required to provide for 100 per cent mission coverages?

3. For the predicted size and shape of the airplane, will adequate work space be available for the crew?

4. Can an emergency escape configuration be provided equally to all crew members which will meet all predicted speeds, accelerations and altitudes of the aircraft?

5. Does the mission require of the system a human ability or skill with no previous counterpart in air operations? If additional skills will be required of the crew members, what methods need be developed to provide the training in these skills?

CONCLUSION

These are the problems that confront jointly aviation and the medical profession today. That there will be a solution, we may be sure. This cannot be done, however, either by aviation or a

new board of aviation medicine alone. It needs the interest and appreciation of these tremendous problems by the entire medical profession and the gradual institution and extension of postgraduate courses in aviation medicine similar to that recently developed in the Harvard School of Public Health. We must interest more young physicians in the problems of and satisfactions in careers in aviation medicine, and in the need for vigorous programs of preventive aviation medicine.

Human control of flight can be successful and acceptable so long as we recognize man for what he is, a human being, then engineer and operate accordingly. There is only one way to achieve fundamental safety in flight—eliminate the exposure.[9]

REFERENCES

1. Anon: Aviation; what's the weak link? *Know the Facts* 2: 5, 1956.
2. Anon: Medical investigation of aircraft accident. *FEAF Command Surgeon Newsletter* 2: 7, 1956.
3. Anon: Progress in aviation pathology. *J. Aviation Med.* 27: 1, 1956.
4. Anon: Some figures that startle the Cabinet. *U. S. News and World Report* 40: 102, 1956.
5. Anon: Where was the flight surgeon? *FEAF Command Surgeon Newsletter* 2: 7, 1956.
6. Alexander, L.: The treatment of shock from prolonged exposure to cold, especially in water. Combined Intelligence Objectives Sub-Committee, G-2 Division, Hq. SHAEF (Rear). Target No. 24, 1945.
7. Armstrong, J. A.; Fryer, D. I.; Stewart, W. K.; and Whittingham, H. E.: Interpretation of injuries in the Comet disasters. *Lancet* No. 6875: 1135, 1955.
8. Brown, J. L., and Lechner, M.: Acceleration and human performance; a survey of research. *J. Aviation Med.* 27: 32, 1956.
9. Christenson, C. M.: Viewpoint of the commercial transport pilot. In *Symposium on Frontiers of Man-Controlled Flight.* Los Angeles: University of California, Institute of Transportation and Traffic Engineering, 1953. p. 60.
10. Flickinger, D.: Crew effectiveness in the B-52 strategic bomber; planning by human factor teams. *J. Aviation Med.* 26: 2, 1955.
11. Griswold, A. W.: The practical value of a liberal education. *Phillips Exeter Bull.* (suppl.) 50: 3, 1954.
12. Lecler, R.: The great *Comet* mystery. *True* 35: 34, 1955.
13. Moseley, H. G.: Personal communication.

DIAGNOSIS OF ACUTE MYOCARDIAL INFARCTION

"The finding of a normal eosinophil count in the period from 5 to 48 hours following an attack, suspected to be acute myocardial infarction, very strongly contradicts the diagnosis.

—KNUT KIRKEBY, M. D.
in *American Journal of Medical Sciences*
p. 55, July 1956

A TECHNIC FOR MILITARY DELINQUENCY MANAGEMENT

I. The Problem and the Program

BRUCE L. BUSHARD, *Lieutenant Colonel, MC, USA*
ARNOLD W. DAHLGREN, *Major, MPC, USAR*

A NEED exists on every Army post for a smoothly functioning approach to the evaluation, retraining, and disposition of prisoners in the post stockade. Although the post commander is assigned such responsibilities[1] he is not provided with the same type of special staff for their fulfillment as is the disciplinary barracks commander. This is so despite the fact that over one half of all prisoners in custody in the United States Army are under jurisdiction of post commanders.[2] This article describes a manner in which these missions have been accomplished at one large Army basic training center without utilizing any additional staff. It appears practicable, from this experience, for the Mental Hygiene Consultation Service (MHCS) to be assigned an active responsibility in the fulfillment of these missions. Active co-operation between command, the stockade, and the MHCS has made possible the achievement of unusually favorable results.

Except where specific comment to the contrary is made, the account which follows is based upon experiences and occurrences at one post during a relatively circumscribed period of time. These experiences cannot, then, be regarded as necessarily typical of military posts at large. It does, however, appear to us that the philosophy and technics of operation are of value to, and may be employed in, other situations.

THE PROBLEM

Confinement of personnel of the United States Army is at a rate of approximately 10 to 12 for each 1,000 persons on active duty. Of this number, 5 to 7 are in post stockades.[2] This constitutes then for command, a substantial sociologic and morale problem. Sixty-five operating, administrative, and clerical per-

From Professional Division, Office of The Surgeon General, Department of the Army, Washington 25, D. C., and Fort Dix, N. J.

sonnel per 100 prisoners are required. This does not include the large number of other personnel who contribute time to the stockade operation. In addition to the substantial number of individuals supplied by line organizations as prison "chasers," almost every post function devotes time to the stockade. The cost of operating a stockade is estimated in the range of $6.60 per prisoner day merely for assigned personnel and messing costs. This does not account for the substantial legal, logistic, or the other enormous costs.[3] This sizable outlay is repaid, however, with discouraging results as the recidivism rate at most posts ranges in the vicinity of 90 per cent. Thus, it must be concluded that this tremendous expense cannot be justified on the basis of its value in respect to the rehabilitation of useful soldiers. Experience, then, suggests that punishment, alone and in itself, is apparently not a particularly valuable or economical technic in this regard. Claims that the mere possibility of punishment may deter other potential delinquents from violating the law cannot be validated. It is clear, however, that if the classical stockade operation has any substantial value whatever, it must lie in deterring the potential delinquent rather than in the rehabilitation of the already delinquent.[4-7]

The criticism that prisons no longer punish is often made. Traditional technics of maintaining a highly punitive attitude, working prisoners at exhausting and debilitating labor for many hours, restricting the quality and the quantity of their diet, and depriving them of common comforts are less commonly found than formerly.[8] In some degree this reflects changing social attitudes, for the increasing humanitarianism characteristic of modern society tolerates such technics less and less each year. Jurisdictions in which older attitudes prevail are subject to such repeated criticism that reform movements have gradually eliminated a great many of the corporal aspects of punishment from many modern penal systems.[9,10]

To some degree, this reflects the rise of progressive and reform movements within the profession of penology itself. Critical, analytic, and introspective penologists have often led the reform of their systems themselves. This has arisen both out of a humanitarian inability to be as punitive as past custodial belief demanded and out of the recognition that such methods are expensive and personally dangerous to the custodial personnel. These policies often present an opportunity for sadistic and dictatorial persons to derive personal satisfaction from their implementation and, most important, serve little or no rehabilitative function. Penologists have thus recognized that a "tough" prison is more difficult and more expensive to operate than others and yet achieves little.[5,11]

In recent years the punishment in military prisons has gone little beyond the discomforts and inconveniences involved in separation from loved ones, sexual deprivation, menial (rarely very hard) labor, and lack of freedom. These uncomfortable measures are perhaps better described as annoyances than as punishments. Prisons are usually adequately heated. Beds are reasonably comfortable. Sanitation and opportunities for personal hygiene are frequently better than that to which some of the inmates have been accustomed in their former life. The "rock pile" has been replaced by industrial work with which most prisoners are familiar and which is rarely foreign to many nonprisoners in the population. The food is usually comparable in quality and quantity to that of the average citizen. In military prisons, the ration is the same as that normally issued to the soldier.[1,12] Medical care is standard and easily available, while opportunities for education, socialization, and some recreation are relatively abundant. In general, in prison the lock step, the degradation, and the stony silence of former years have almost disappeared. It is unlikely that society would allow retrogression even if individuals capable of imposing it could be located. Persons capable of successful imposition of any great increase in discomfort are more likely to be found among the imprisoned than among the free population.[13]

In military prisons, the means of punishing prisoners who have committed offenses within prison walls are equally restricted. While the opportunity to segregate such a person and restrict the "tastiness" of his diet remains, the diet must be of adequate caloric value. Such a prisoner must be medically examined daily and cannot be physically abused.[14] This latter has been true, at least officially, since publication of *The Military Laws and Rules and Regulations for the Armies of the United States* on 1 May 1813.[15]

In many prisons and especially in military prisons, the attitude and behavior of custodial staffs has undergone a similar evolution. They have frequently learned to behave with the detachment and easy tolerance of social workers. They have learned to ignore verbal assault, no longer respond violently to anger, and now tend only to protect themselves from actual physical assault. They look upon their charges as essentially ill and frequently demonstrate a definite skill in treating them, although their skill is one which is more likely to secure immediate compliance and co-operation than long-term recovery from the delinquent state. Custodians are less obsessively security minded and are more willing to "take a chance" in the form of recommending clemency, parole, and trustee status. Frequently, they encounter resistance to their ideas, both in the administration

and among an angry or frightened population. They are acutely aware that while to "throw him in jail" may limit the trouble to within the prison walls it usually produces more, not less, trouble.

The study reported here is based upon a 2½-year experience during which the Mental Hygiene Consultation Service became a continuous, co-operating, assisting agency in a stockade operation. It provides a history of the development of this technic and proposes a *modus operandi*. Although it is not necessarily the best which might be developed, it does appear to have value. During the period of this operation, the recidivism rate has fallen, the number of disturbances has diminished, and the management of the psychiatric workload has become an easily handled flow rather than a spotty, difficult problem accented by many emergencies.

In addition to improvement in those areas which lend themselves to statistical study, there has been a change in attitude, an improvement in motivation and morale, and an increased conviction on the part of all persons who participate that "at least something is being done." Stockade duty has become less onerous and stockade cases have ceased to appear so hopeless to examining psychiatrists.

HISTORY OF EVENTS LEADING TO REORGANIZATION

The Mental Hygiene Consultation Service has had, from its inception, some type of relationship to the stockade. At times various programs were established for short periods, but these rarely included the total prisoner population and never represented a real, co-operative, combined effort with both command and psychiatric personnel participating. The custodial and psychiatric staffs never previously established an integrated working relationship. The programs themselves were not so much "prison psychiatry" as simply psychiatric study within prison walls. Results, therefore, had not been impressive.

The stockade itself is not usually a central concern of a military commander. Especially on a basic training post, it is a sort of "backwater," for the commander is aware that the military potential of the inmates is generally low. His time and energy are directed primarily at the training of nondelinquent individuals who present a good many problem themselves.

Persons who are confined no longer participate in basic training and are, for this reason, transferred out of their basic unit into a "replacement company." This company is also the official unit of apprehended individuals from other Army areas, deserters, and any other person who for any reason—frequently nondelin-

quent—does not participate in training. The delinquent thus ceases to be a part of an organization in which he is known. His former commander has neither responsibility for nor interest in him. The commander of the replacement company does not even see him. He is of interest to and is known by the confinement officer and his staff alone.

For MHCS purposes the group might be defined as a screened collection of individuals of poor military adaptation potential. There is rarely basis for speculation on this score, little likelihood that others will argue about it, and no subtlety in the situation requiring extensive screening by MHCS. It is, then, an area in which this service can operate inexpensively, depending upon normal social procedures and other agencies to do the initial screening. Further, the MHCS is unable to avoid almost continuous contact with this group, for they are referred in large numbers by command, the dispensary, and for pretrial evaluation. Regardless of planning, a substantial portion of their effort is, for these reasons, directed at this group. When the prisoners are seen at MHCS proper, it is not uncommon to have three or four armed guards and an equal number of prisoners sitting about the waiting room. This, to be sure, does not create an ultimately desirable experience for the nondelinquent youthful trainees who also share the waiting room. If the prisoner attempts to escape, a series of incidents will arise with which a medical installation is not prepared to cope. At times, the guards insist upon exercising their right to remain with their prisoners even during the psychiatric interview and consequently make examination impossible.

In view of these factors, the stockade at this post was, in 1954, a serious problem area. The prisoners were sullen and un-co-operative, the population was large, running at about 18 per 1,000 troops, and the number in disciplinary segregation was high, being at times 10.4 per 100 prisoners. Prisoners with two or more convictions accounted for 30 per cent of the population, and the number of persons with three or more convictions was substantial. Finally, individual and organized rebellion was a frequent occurrence, requiring the attention of the post commander.

This culminated, in the fall of 1954, in a major disturbance in the course of which nearly all order was lost and the custodial personnel were driven from a section of the stockade. Even an effort by the commanding general himself to quell the riot was unsuccessful and he was nearly injured when rocks were thrown at him. The situtation was comparable to that at San Quentin prisson in 1939.[5]

When order was restored and the guard complement augmented, an over-all reorganization of the system of handling delinquents was directed. Certain of the custodial personnel were replaced

and a more understanding yet more firm attitude was initiated and maintained. An especially mature officer was appointed confinement officer.

Investigators were appointed to screen the population and to recommend action to be taken in individual cases. These officers found problems abounding in the population. There were persons who had as many as seven prior convictions. Some had literally never served an honorable day, and there were many more whose total honorable service fell below 10 per cent of their total service. There was no established way to expedite the elimination of narcotic addicts, alcoholics, or homosexuals whose very presence serves as a nidus for disruption, temptation, and disorder in any prison.[13] Although the mass of the sentenced prisoners were in confinement for minor offenses, many of them were so antisocial that a prison of less than maximum security represented more nearly a challenge for escape attempts than a reliable means for retention. They were literally "big-time operators" in a confinement facility designed to restrain only the minor offender. Not only were they a direct source of disciplinary problems, but they were uncommonly capable of leading others astray and organizing concerted efforts at resistance to authority. A persistently un-co-operative or delinquent trainee must be removed from his company and disciplined. Although this solves the problem on the company level, it does not do so for the post, and really represents the beginnings for the search for a solution and not the end. It became clear to the investigators that a means of handling these individuals must be developed and that it must be at a post level.

THE PATTERN OF THE REORGANIZATION

The reorganization directed was accomplished through the establishment of three routines:

1. A post level agency was delegated the responsibility to convene a board of officers, under the provisions of an appropriate regulation to consider discharge from the service for all individuals following their third conviction by court-martial. This agency, in this case designated Post Investigations,[16-18] also hears other cases upon the recommendation of unit commanders, the confinement officer, or the MHCS. Through liaison with the stockade, these cases are heard not less than one month before the completion of the sentence. Processing takes place in such a way that completion of sentence and discharge from the service, if approved, are coincident. This averts the problem that arises from the fact that many of these people will not remain on the post long enough to be discharged after release from confinement. This is one of the predominant factors leading to repeated and obviously pointless and expensive trial by court-martial.

444645 O - 57 - 5

2. The confinement officer was to institute rehabilitative programs:

a. All employable prisoners were to be given work with which they were familiar or were to learn new, employable skills of value to the military. Their use in pointless menial labor was to be avoided. Shops were started for their employment in painting signs, repairing targets, and other menial but not degrading work. Authority to establish a shop for the repair of tentage and other such field equipment was requested and the permission was granted. This shop is under the technical supervision of the post quartermaster.[19]

b. Mature attitudes were to be maintained. Military discipline was to be used in its constructive sense toward rehabilitation and not in a merely punitive manner, for "brutality and lax discipline go hand in hand."[8, 13]

c. A rehabilitation company was established. This is a minimum security portion of the stockade located outside of prison walls with prisoners in parolee status. A board consisting of the commanding officer of the prisoner battalion, the stockade chaplain, and a member of MHCS was appointed and designated the Classification Board. Any sentenced prisoner may, upon the recommendation of MHCS, appear before that board. He is eligible for assignment to this company upon the recommendation of the board and upon the approval of the confinement officer. The decision is based upon the prisoner's behavior and his apparent rehabilitative potential. While in the rehabilitation company, the prisoner completes his training by being attached, during appropriate hours, to a unit in the proper phase of training. If he is not a trainee, he becomes available for other work.[12, 14, 20, 21]

d. The clemency system was enhanced. A board of officers, designated the Clemency Board, was appointed. It consists of a member of the line (usually the president), a member from The Judge Advocate General section, one from The Adjutant General section, the stockade chaplain, and a member of the MHCS. This board may recommend suspension of sentence after the prisoner has served between one third and one half of his sentence. This recommendation is dependent upon his behavior, attitude, and rehabilitative potential. Appearance before the Clemency Board is not dependent upon prior assignment to the rehabilitation company.[14, 22–24]

e. The system of parole was enhanced. Prisoners who can be employed about the post are placed on parolee status when it is reasonable, in the judgment of the confinement officer, to do so and they are allowed to go from their place of employment without a guard.[19]

f. The custodial personnel remain alert for evidence of the existence of "cliques" and other organized activities in the prisoner group. Suspected leaders are placed in an adminstrative, nonpunitive segregation. Others so segregated are suspected or admitted homosexuals, alcoholics, drug addicts, noncommissioned officers, former stockade personnel, persons requiring extensive medical treatment, and others who, in the judgment of the confinement officer, represent a source for or a nidus of disruption, poor morale, or bad discipline.

g. Disciplinary segregation and loss of accrued good conduct time are used when and if it becomes necessary, for any reason, to emphasize the punitive aspect of the confinement.

3. The Mental Hygiene Consultation Service enhanced and formalized its relationship to the stockade.

a. All prisoners are examined within 14 days after sentence is pronounced. Pretrial examinations are prompt if and when they are requested by the commander or the defense or trial counsels.

b. Persons requiring psychotherapy receive it.

c. Persons, especially first offenders, likely to benefit from transfer to the rehabilitation company are referred to the Classification Board at the appropriate time.

d. Appearance before the Clemency Board is recommended at the appropriate time.

e. Negative recommendations are made regarding both clemency and transfer to the rehabilitation company, if, for any reason, these appear inappropriate.

f. Close liaison is maintained with the confinement officer in finding mutually agreed to solutions for such problems as tantrums, suicidal gestures, suspected psychosis, evidence of organized resistance, cliques, et cetera.

g. When rehabilitative efforts have been attempted and significant evidence of their lack of success has been amassed, positive recommendations for separation from the service are made.

(1) All persons whose records reveal three or more courts-martial are recommended for appearance before a board of officers convened under provisions of Army Regulation 635-208[25] or Army Regulation 635-209.[26] If the examiner is of the opinon that, for some special reason, retention is in order, he may so recommend to the board. However, he does not seek to prevent the actual appearance before the board. This assures that all such cases are subject to mature command consideration.

(2) The MHCS remains conservative in recommending separation for persons with fewer than three convictions on record. It is regarded as unlikely that such persons, whatever their verbal attitudes, have been offered the full effort of rehabilitation.

(3) Any person, whatever his number of courts-martial, in whose case there is reasonable evidence of homosexuality, alcoholism, or drug addiction is recommended for separation under the appropriate regulation. Remission of sentence in order to expedite discharge is also recommended. Evidence of such activities is obtained not only from interview with the prisoner, but from operating personnel as well. This is not to say that mere willingness to confess such activities necessarily leads to any official action. Reasonably acceptable collateral evidence is required lest such confessions be used by great numbers merely to achieve an early release. The Command is also willing to entertain a recommendation for remission of sentence and expeditious separation from the service in other selected cases when interview or the record suggests that antisocial or organizing tendencies are beyond the capacity of the stockade to control.

The procedures authorized, then, were so constructed that command was assured that no individual would in effect get "lost" and simply stay on indefinitely, neither being disposed of definitively nor rendering meaningful service. It can be seen that MHCS occupies a central position, being the initiating agency in much of this program. It also soon became evident that this is the only agency which has sufficient contact with the individual to make meaningful recommendations. It is, in addition, possible for this agency to remain somewhat more objective about an individual prisoner since members of the MHCS do not have immediate responsibility for him. The reviewing authority can therefore assume that MHCS recommendiations are more detached and moderate than might be those of others and, for this reason, more readily place reliance upon them.

THEORY OF OPERATION

The nature of military justice is such that persons entering confinement are rarely true first offenders. Examination of the history of an individual confinee will ordinarily reveal that his earliest offenses, if purely military, were first overlooked and later dealt with through Article 15, Uniform Code of Military Justice.[37] His first sentence to confinement is usually suspended. In the main, the confinee has been offered both extensive counseling by various agencies and a good deal of "easy" or "gentle" disciplining. Simple advice or forgiveness has been proven to have insufficient impact to lead to improved behavior. Nor have

the usual treatment technics ordinarily available through psychiatric agencies had a significant effect on this problem.[28]

From the prisoner's point of view, the situation is hopeless. He either consciously rejects his military obligation or, if he accepts it, has found some reason for not fulfilling it. He expresses the opinion that he must take care of his mother, or his wife, or the family business, or he has some other excuse. In erecting such a rationalization, he finds both an excuse for his misbehavior and a basis for anger at the Army because it does not take the necessary action to return him to his home. Angry when first confined, he is then most resistant to any type of rehabilitative effort.

From the commander's point of view, the problem is also great. This is a man who, despite frequent offers of special consideration, continues to behave in an angry, inflammatory, and insubordinate manner. His behavior has been and is such as to impugn military order and destroy discipline. Concomitantly, his impact upon the discipline and attitude of others who have not yet indulged in such florid behavior seems great. The commander, therefore, is forced to assume that if he continues to tolerate this individual's misbehavior, others will follow suit. The officer who has contact with such an individual almost certainly becomes angry, and often allows his attitude to become one in which desire to "show this guy a thing or two" becomes a factor.

Thus, by the time a soldier has been confined, both he and the individuals dealing with him have sometimes lost their perspective so completely that the situation is at an impasse. The prisoner behaves in a manner which serves him poorly and the individuals who deal with him have allowed their emotions to control the situation to the degree that they accomplish little save to give the prisoner a good excuse for his anger.[29]

The outcome of this situation varies, but there is a common and readily observable pattern. This is primarily based upon the simple fact that the prisoner's anger usually causes trouble to no one but himself. He batters his head against a wall not so much made of stone as of a material that is not only unyielding but uncaring. Unless he is able to organize with others in such a way as to bring discomfort to the organization through his anger, he simply compounds his situation.[30] Nevertheless, some 30 per cent of prisoners indulge in some type of ill-disciplined behavior during the first six weeks of confinement.

At a period that ranges ordinarily between the 30th and 60th day, the average prisoner is least recalcitrant. He is then most amenable to accepting some evidence from authority that it was his behavior which was rejected, not his person. The difference

between his attitude at that point and his attitude when he was first confined may be dramatic. If an observer is sensitive, he will note some effort on the part of the prisoner to achieve some type of nondelinquent acceptance. He sometimes must do this covertly lest he suffer rejection by his fellow prisoners if it becomes evident to them.[30] Nevertheless, he frequently makes some effort in this direction. This might be interpreted as the point at which authority has won the struggle. When this occurs, the prisoner is ready to comply and sometimes merely seeks some way to return to the good graces of authority in a reasonably dignified manner. If, during this period, opportunities are available for parole, clemency, or other procedures in which a degree of acceptance or at least partial trust and forgiveness are implicit, he may be moved away from his identification with delinquency and toward a more meaningful relationship with society. If such procedures are not available, he will ordinarily lapse into a type of apathy, retain or perhaps even intensify his relation with the delinquent group, and become, at least, a poor risk for rehabilitation or perhaps even a severe delinquency problem within the stockade itself.

This process may then be described as one in which the prisoner has two models with which to relate and to identify. He may identify with the prisoner group and indulge in the misapprehension that delinquency is a pattern of behavior with social value. On the other hand, he may identify with the custodial group who represent "society" and attempt to emulate their more successful transactions with their environment. Although the first identification is usually with the prisoner group, many prisoners will shift their indentifications from one extreme to the other in the manner described. Rehabilitation is derived, then, partly from timing the offering of clemency at the moments when the more acceptable identification is in the ascendancy.

There are, of course, many who do not follow this pattern. Many who do follow it are unable to maintain a satisfactory level of behavior for a protracted period and lapse into delinquent behavior. Statistically, the results of such a plan as this are not remarkable, but the efficacy of almost any procedure in handling this type of problem is not great and one must not allow his modest statistics to discourage him.[29] The results of this program compare favorably with those of a long-term project in a state penal system which had a 29 per cent incidence of reincarceration.[31] Others have ranged to as high as 60 per cent.[13]

The philosophy which underlies this program can be fairly simply stated: A military delinquent pursues patterns of behavior which consciously seem to him (1) to achieve his immediate desires most directly, (2) are successful in acheiving a measure

of social success, and (3) cost him the least.[30, 32–34] The treatment program is then designed to ascertain that the outcome is such that each of these aims is better achieved through conformity with normal social values than through noncomformity.[29]

Taking the three projected urges of the delinquent as topic headings, the program is organized as follows:

1. The Delinquent Wishes to Achieve His Immediate Desires as Directly as Possible. Psychiatry refers to the delinquent as suffering from an impulsive character disorder. He has not learned to get the things he wants out of life by careful planning, by working, or by establishing a working relationship with his community. He has not learned to achieve things by his own efforts; he impulsively grabs what he wishes with little planning and little thought of the consequences. Rather than view failure to get what he wants as an indication that he has failed to provide for himself, he blames others. Any maturity he may appear to have is a pseudo maturity in that he has not learned to be a self-sustaining individual. The delinquent then appears to be primarily intent upon short-term goals. Sometimes, on the other hand, his goals are more complex but distorted. An example of this lies in the exaggerated masculinity assumed by some delinquents. Proof of masculinity even at the cost of remarkable physical pain, though not necessarily a short-term goal, is a prime mover of these persons. In other cases, the goal may be obscure or of a profoundly unconscious origin, as in the case of the delinquent whose behavior arises out of a need for or pleasure in punishment. These more complex phenomena sometimes require more extensive types of study and treatment than is here described.[34]

A program for his rehabilitation need nor punish his past misbehavior in order to make it sharply evident to him that such behavior has not achieved a great deal for him. Among the requirements is the maintenance of a sharp degree of objectivity on the part of individuals dealing with him. Most of the explanations given for misbehavior are not entirely truthful and some are frank lies. An occasional one is nearly reasonable. Although one cannot *believe* the explanations, it is of great importance that each be objectively investigated. On the one hand, the objective fact is necessary if one hopes to point out the defects in his story to a given individual. On the other hand, if but one individual has told the truth, is disbelieved, and later is able to show that his mother, for example, has realistically suffered as a result of this disbelief, all other prisoners will have received evidence testifying not to the fact that their behavior accomplishes nothing but rather that they are outcasts about whom no one cares.[35] They will have found a justification for

more, not less, misbehavior. Only with real facts, can the inappropriateness of misbehavior be brought into a palpable relief.

2. The Behavior Represents an Attempt to Secure Social Success. Nearly all people are bound together by their common interests, and each receives support in his individual behavior through such an association. Although the delinquent does not form very competent relationships, he is unusually in need of such support. Among the reasons he seeks it from other delinquents is his feeling of having been abandoned by conforming people. If the individual has no opportunity as an *individual* to form some type of relationship with the society he has offended, his initial anger will persist and he will quickly find other delinquent individuals to whom to relate. Soon a clique or a group spirit is born in which delinquency is a socially valuable phenomenon.[29] By its unrelenting stand, society has produced a situation which encourages delinquency. A situation has been so structured that the delinquent has no choice but to do the thing he wishes almost automatically to do anyway. That is, to find others who feel as he does, mutually to resist authority and consequently achieve some feeling of self worth. Under these circumstances, the confinement officer finds himself not with a great many individual offenders to deal with but rather with an organized mob over which he has little control.

One attempts to avert this by de-emphasizing the notion that the prisoner is being punished for what he *has done* and by emphasizing that his future accomplishment depends upon the social value of his conformity. Obviously, he must be provided with some kind of acceptable, meaningful, and reasonably dignified opportunity to conform to reasonable activities and socially acceptable restrictions. One must also ascertain that the individual prisoner has more to gain from negotiating with society as *an individual* than as part of a group. If, whatever he does, the individual sees no possibility of achieving acceptance, he will tend to join a delinquent group. If, however, his problem is dealt with in an individual manner and he may get clemency or other special consideration only as an individual, the formation of groups will have no real value to the individual, and to that degree will be discouraged. Such a program at this *must*, then, be carefully individualized.

3. The Delinquent Seeks to Achieve the End He Feels Is Least Cost to Himself. In this regard a punitive aspect of the situation is preserved. It is an economic truism that it is at least potentially more expensive or perhaps more uncomfortable to fail to conform than to conform. Humans will rush to what they think is the least costly type of behavior.

The operation of such a program must be carried out in such a way that if an individual cannot be dissuaded from delinquency, at least it costs him more than conformity to societies' demands would. The recalcitrant prisoner must find that he remains behind after the more conforming person has left. No particular behavior pattern which is delinquent and which is designed, at little cost to the individual, simply to force the hands of authority can be allowed to succeed. The most frequently encountered of such activities are suicidal gestures, temper tantrums, and hunger strikes. In such cases, prompt determination must be made as to whether such behavior is the product of a frankly psychotic mental disease. Immediate hospitalization is necessary if such mental disease is present. If not, both the psychiatrist and the stockade staff must have the courage and strength of purpose to deny the prisoner's bid for special attention even though, in the end, such behavior usually will influence one toward a final decision recommending discharge from the service. If and when the individual is to be granted the attainment of the goals which motivated such behavior, this success must come only after the behavior has been abandoned. The hunger striker who returns to the mess hall and the suicide gesturer who is sent back to work serve as marked evidence that such behavior is not valuable. To accord such individuals special treatment tends to enhance the probability of whole epidemics of such behavior. Co-operation between psychiatric and stockade personnel in carrying out this kind of procedure is essential. It might be easier for all concerned to deal differently with an isolated case, but one is then at a loss to know what to do with 10 of them. During the period reported on, there was not a single case of successful suicide in the stockade, even though the population always included two or three people who periodically threatened it.

This program is designed, then, to promote group forces which tend to press individuals toward nondelinquent patterns of behavior. This is accomplished through providing the prisoner group with only that information on which they can predict what will occur if they conform with normal social attitudes and behavior patterns. They must know that if they conform in a proper manner, opportunities exist for eventual restoration to a satisfactory position in society. They must not be able to predict what delinquent singular things they can do or what frightening or threatening statements they can make to secure an early release, special attention, or disorganization of the administration. They are sensitive to ways in which they can remain delinquent and will use these ways if they sense a weakness in the system. They will soon sense the existence of a too rigid policy which, for example, requires that all individuals given to a certain act

be discharged from the service immediately. They will then have information available as to the price they must pay to get out of the stockade or the Army. To deal with each such case on its own merits, tends to produce a sufficiently varied pattern of administrative response so that such an outcome can be avoided and the prisoner group can be deprived of knowledge of such policies even if they exist.

REFERENCES

1. Guardhouses, Stockades, and Hospital Prison Wards. AR 210-188, 31 May 1951.
2. Office of The Provost Marshal, Department of the Army.
3. Statistical Section, Comptroller's Office, Fort Dix, N. J.
4. Zilboorg, G.: *The Psychology of the Criminal Act and Punishment.* Harcourt, Brace & Co., Inc., New York, N. Y., 1954. pp. 27-33.
5. Scudder, K. J.: *Prisoners are People.* Doubleday & Co., Inc., Garden City, N. Y., 1952. pp. 5-7; 13-21.
6. Lindner, R. M.: *Stone Walls and Men.* Odyssey Press, Inc., New York, N. Y., 1946. pp. 383-398.
7. Glueck, S., and Glueck, E. T.: *Criminal Careers in Retrospect.* (Harvard Law School Studies in Criminology) The Commonwealth Fund, Division of Publications, New York, N. Y., 1943. p. 189.
8. Gillin, J. L.: *Criminology and Penology.* (Century Social Science Series) Appleton-Century-Crofts, Inc., New York, N. Y., 1954. pp. 335-346; 433-446.
9. Biggs, J.: *The Guilty Mind: Psychiatry and the Law On Homicide.* Harcourt, Brace & Co., Inc., New York, N. Y., 1955. pp. 187-188.
10. Break at State Penitentiary in Walla Walla, Washington. *Time Magazine.* 54: 18, July 18, 1956.
11. Duffy, C. T.: *The San Quentin Story.* Doubleday & Co., Inc., Garden City, N. Y., 1950. pp. 15-36.
12. Guardhouses, Stockades, and Hospital Prison Wards. SR 210-188-1, 31 May 1951.
13. Martin J. B.: *Break Down the Walls.* Ballantine Books, Inc., New York, N. Y., 1954. pp. 173-175; 154-182; 175; 233-234.
14. Prisoners; General Provisions. AR 633-5, 29 Mar. 1956.
15. *The Military Laws and Rules and Regulations for the Armies of the United States,* May 1, 1813. Cited in Ganae, W. A.: *The History of the United States Army.* D. Appleton Century Co., New York, N. Y., 1942. p. 129.
16. Fort Dix Memo No. 56. Discharge of Enlisted Personnel UP AR 635-208 and AR 635-209, dated 12 Apr. 1956.
17. Fort Dix Letter. Subject: Elimination of Habitual Offenders, dated 26 Apr. 1956.
18. First Army Circular No. 8. Elimination of Marginal Personnel, dated 5 Sept. 1956.
19. Fort Dix Memo No. 235. Prisoner Employment Program, dated 17 Dec. 1956.
20. Accounting Procedures for Prisoners' Personal Property and Funds. SR 210-185-15, 30 Jan. 1953.
21. Fort Dix Memo No. 100. Prisoner Rehabilitation Program, dated 26 June 1956.
22. Fort Dix Memo No. 189. Standing Operating Procedure of Clemency Board, dated 5 Nov. 1956.
23. Restoration of Military Prisoners Sentenced to Confinement and Discharge. AR 600-332, 24 May 1951.
24. General Provisions for Discharge and Release. AR 625-200, 6 Dec. 1955.
25. Personnel Separations--Discharge--Undesirable Habits and Traits of Character. AR 635-208, 21 May 1956.
26. Personal Separations--Discharge--Inaptitude or Unsuitability. AR 635-209, 17 Mar. 1955.
27. *Uniform Code of Military Justice.* Part III--Non-Judicial Punishment. Art. 15. Commanding officer's non-judicial punishment.
28. Abrahamsen, D.: *Crime and the Human Mind.* Columbia University Press, New York, N. Y., 1944. pp. 192-222.

29. Bromberg, W.: *Crime and the Mind.* J. B. Lippincott Co., Philadelphia, Pa., 1948. pp. 49; 52; 29; 96.

30. Redl, F., and Wineman, D.: *Children Who Hate.* The Free Press, Chicago, Ill., 1951. pp. 168; 141-196.

31. Rumney, J., and Murphy, J. P.: *Probation and Social Adjustment.* Rutgers University Press, New Brunswick, N. J., 1952. p. 166.

32. Wilson, D. P.: *My Six Convicts: A Psychologist's Three Years in Fort Leavenworth.* Rinehart & Co., Inc., New York, N. Y., 1951.

33. Glueck, S. S., and Glueck, E.: *Later Criminal Careers.* The Commonwealth Fund, Division of Publications, New York, N. Y., 1937. pp. 62-134.

34. Alexander, F., and Staub, H.: *The Criminal, the Judge, and the Public.* Free Press, Glencoe, Ill., 1956. pp. 29-57.

35. Fine, B.: *1,000,000 Delinquents.* World Publishing Co., New York, N. Y., 1955. pp. 110-117.

(To be concluded)

SCOLIOSIS

"Early recognition of scoliosis is possible if the back is examined with the patient bending forward. This should be part of every physical examination in children. Deformity increases most during the period of rapid vertebral growth from 11 to 15 years of age unless it is corrected. The severity of scoliosis is expressed in degrees of angular measure as determined on the roentgenogram. If it exceeds 30 degrees, complete restoration is no longer likely to be achieved because the average amount of correction obtained by traction, body casts, and surgical fusion of the affected vertebrae is about 25 degrees. The use of a localizer cast makes it possible to keep the patient ambulatory all the time, except for the 7 to 10 days after surgery. The total period of immobilization of the patient's back after operation is 8 to 10 months."

—JOSEPH C. RISSER, M. D.
in *Journal of the American Medical Association*
p. 134, May 11, 1957

Clinicopathologic Conference

U. S. Naval Hospital, Corona, Calif.*

ABDOMINAL PAIN, ANEMIA, AND SUDDEN DEATH

Summary of Clinical History. A 26-year-old married white woman had nausea, vomiting, and lower abdominal pain in July 1955. She was told by a physician that she had a bad tube and needed an operation. She refused the operation, however, and recovered until the onset of the illness requiring her first admission to this hospital.

FIRST ADMISSION

The patient was first admitted to this hospital on 14 October 1955. For five days, following a normal menstrual period, she had been experiencing nausea, vomiting, and right lower abdominal pain of increasing severity, which radiated to the back. For two days prior to admission, she had a cough productive of one-half cup of sputum per day. No diarrhea or constipation were present. There was no history of recent sexual intercourse, her husband having been overseas for several months.

At the age of six years she had diphtheria and a tracheostomy. At eight years of age she was suspected of having poliomyelitis. For many years as a child she had frequent nose bleeds, but none in recent years. For several years she had had frequent sore throats and bouts of coughing productive of yellowish sputum. The patient was a heavy smoker. Four years prior to this

*Capt. Alton C. Abernethy, MC, USN, Commanding Officer.

hospital admission she received a bullet wound of the liver requiring laparotomy, from which she completely recovered. The patient has one child four years of age and has had no miscarriages.

Physical Examination. The patient was moderately well nourished and of average development. Her blood pressure was 116/68 mm Hg; temperature, 99.6° F; pulse, 88 per min; and respirations, 20 per min. There was increased pigmentation of the skin and mucosa. The patient was a brunette. The nasal and pharyngeal mucosa were congested. The heart, lungs, and breasts were normal. The abdomen was soft; there was tenderness without spasm in the lower abdomen, but none in the flanks. On bimanual pelvic examination there was tenderness, more so on the right side. The cervix was normal; the uterus was small, retroflexed, and in the midline. One examiner noted pain on motion of the cervix, and thickening and tenderness of the sacrouterine ligaments and both adnexa, but no definite masses.

Laboratory Studies. The urine was normal and had a specific gravity of 1.026. A white blood cell count was 13,150 per μl, with 3 per cent band forms, 71 per cent neutrophils, and 26 per cent lymphocytes. Hemoglobin was 12.8 grams per 100 ml; hematocrit, 37 ml per 100 ml; and red blood cell count, 3,920,000 per μl. The red blood cell indices were: mean corpuscular volume (MCV), 99 cu μ; mean corpuscular hemoglobin (MCH), 32 $\mu\mu$g; and mean corpuscular hemoglobin concentration (MCHC), 34 per cent. An antistreptolysin titer was 1:50. A roentgenogram of the abdomen showed normal findings and one of the chest revealed clear lung fields and a cardiac silhouette of normal size and position. An electrocardiogram disclosed normal findings.

Course in Hospital. The patient was treated with penicillin and streptomycin sulfate. On 15 October she was afebrile and abdominal tenderness was minimal, with no rebound or guarding. On 16 October her abdomen was not tender and she felt well. On 17 October she complained of right suprapubic pain and stated, "The bones of my legs hurt and I can't move on waking in the morning." On 23 October she was afebrile, her abdomen was not tender, and she felt well. Pelvic examination revealed tenderness of the right fallopian tube. She was discharged on the ninth hospital day.

FINAL ADMISSION

On 29 October 1955, she returned to the outpatient clinic complaining of shortness of breath, nausea, vomiting, and multiple aches and pains. The shortness of breath was present at rest as well as on exertion. Physical examination of the chest disclosed normal findings except for hyperventilation. Blood pres-

sure was 104/78 mm Hg and pulse, 120 per min. Examination of the abdomen revealed normal findings. It was thought that her symptoms were on an emotional basis and 0.1 mg of Serpasil (brand of reserpine) three times daily was prescribed. On 1 November a neighbor called the hospital to say that the patient was very sick, and she was readmitted.

The patient stated that following discharge from the hospital she had done well for one week. She then began to be short of breath, had fainting spells, and bouts of nausea, vomiting, diarrhea, and abdominal and pelvic pain. She had also become apprehensive. Sometime in the preceding three days she had fainted in her bathroom, striking the left side of her face against the tile. She had some burning on urination, and noted the passage of bright red blood from the vagina when voiding or defecating. She denied the ingestion of any poisons or drugs other than Serpasil.

Physical Examination. The patient was acutely ill, pale, markedly dehydrated, slightly cyanotic, and breathing rapidly. Her temperature was 96.4° F rectally; pulse, 80 per min; respirations, 30 per min; and blood pressure, 70/40 mm Hg. There were ecchymoses in the left orbital area and over the right knee. No petechiae were present. The mouth was dry, the tongue was coated and brown, there was no acetone odor to the breath, and no lead line or mucosal burns. The neck was supple. No enlarged lymph nodes were present. The lungs and heart were normal. The abdomen was soft and flat. There was generalized abdominal tenderness on light palpation, more marked in the epigastrium and right upper quadrant. The liver edge was palpable 2 to 3 fingersbreadth below the right costal margin. The patient complained of pain in the knees on movement, and of abdominal pain on movement of the thighs, especially the right. On pelvic examination, the uterus and adnexa were normal and there was little tenderness. Tendon reflexes were somewhat hyperactive, but equal; there were no abnormal reflexes. The left ocular fundus was normal, but the right was not visualized. One observer thought there was slight icterus.

Laboratory Studies. The urine was amber and acid, with a specific gravity of 1.022; albumin, 3 plus; normal sugar; and 10 to 15 coarsely granular casts and 8 to 10 white blood cells per high-power field. A red blood cell count was 2,540,000 per μl; hemoglobin, 9 grams per 100 ml; and hematocrit, 24 ml per 100 ml. Red blood cell indices were: MCV, 94 cu μ; MCH, 35 $\mu\mu$g; and MCHC, 37.5 per cent. A white blood cell count (including nucleated red cells) was 50,000 with 57 per cent neutrophils, 5 per cent band forms, 5 per cent metamyelocytes, 1 per cent myelocytes, 30 per cent lymphocytes, and 1 per cent monocytes. The smear showed 44 normoblasts per 100 white cells. Platelet

count was 300,000 per μl. Coagulation time of venous blood was 3 min 15 sec. The prothrombin time of the patient was 27 sec, control 15 sec. Serum bilirubin was: 1 min direct, 1.0 mg per 100 ml; 30 min direct, 1.6 mg per 100 ml; and 30 min total, 4.0 mg per 100 ml.

Course in Hospital. The patient was placed in an oxygen tent and 1,000 ml of 5 per cent dextrose in water was given by vein. Her blood type was O positive. A transfusion of cross-matched, O-positive blood was started at 1810 hours, after the blood specimen for laboratory examinations had been obtained. At 1830, after 100 ml had been administered, the patient screamed for help and went into profound collapse. She was pronounced dead at 1840.

DISCUSSION

Doctor Hill:* From a study of the protocol it appears that the patient definitely had a gynecologic problem, and while it may not be the major one, it was a contributing factor in her illness.

The onset of such symptoms following menses often suggests pelvic inflammation, and the history of previous medical examinations further strengthens such a hypothesis. Tubal abortion can mimic most any syndrome of pelvic origin and must be strongly considered despite the menstrual and absence of sexual contact history. The temperature of 99.6° could be present in various types of tubal disease, and the rather negative findings on pelvic examination do not rule out tubal abortion, though they eliminate any marked inflammatory process. The laboratory findings on the first admission are not indicative of any specific abnormality.

Apparently the process responded promptly to antibiotics only to recur six days after discharge from the hospital. The symptoms described at the outpatient visit, plus the rapid pulse, strongly suggest oxygen want; it may have been hemorrhagic in origin, such as is seen with reactivation of tubal abortion when the process is temporarily stayed by adjacent visceral adherence, omental attachment, and the like.

It would have been wiser to readmit the patient to the hospital for further observation and treatment at this point; a posterior colpotomy might have been indicated.

At the second admission to the hospital the record shows that the patient evidently had urgency and had fainted in the bathroom. She had pelvic and abdominal pain, nausea, vomiting, and diarrhea. This to me forcefully intimates pelvic bleeding; a tubal abortion will give almost the identicial picture as portrayed. The physical examination elicited some findings characteristic of internal hemorrhage; the gen-

*Capt. Harold H. Hill, MC, USN, Chief, Dependents Service.

eralized abdominal tenderness plus rather negative pelvic observations by no means eliminated the possibility of tubal bleeding.

The liver enlargement plus marked aberrations of laboratory tests indicate systemic disease whose nature the medical service will attempt to fathom. From the gynecic viewpoint, I am strongly inclined toward the diagnosis of tubal disease and most especially toward a tubal abortion in some phase.

Doctor Fox:* In discussing this case I plan to concentrate on the anemia. First, let's review the findings in her blood. During her first admission on 15 October 1955, she had slight leukocytosis with slight increase in the neutrophils. There was a borderline value for the hematocrit. The cell indices were MCV, 99; MCH, 32; and MCHC, 34. These values are within the limits of laboratory error. On the second admission, 1 November 1955, she had moderate anemia, the hemoglobin having dropped from 12.8 to 9 grams per 100 ml and the hematocrit from 37 to 24 ml per 100 ml. The indices were MCV 94, MCH 35, and MCHC 37.5. These values were essentially unchanged from the previous ones. In addition, the white blood cell count was elevated to 50,000 per μl; 44 per cent of these cells were normoblasts, leaving an actual leukocyte count of 28,000. Differential showed 57 per cent neutrophils, 5 per cent bands, 5 per cent juveniles, and 1 per cent myelocytes; a total of 67 per cent myeloid cells and a definite shift to the left with immature cells. The platelets were normal. The anemia was moderate in degree and was normocytic and normochromic. Other laboratory tests of immediate concern were the coagulation time, which was normal, and the prothrombin time, which was moderately prolonged but not in the range to cause bleeding. The serum bilirubin was 2.4 mg per 100 ml indirect, 1.6 mg per 100 ml direct at 30 min. In addition, the patient had hepatomegaly, but her spleen was not palpable.

I want to start with the consideration of various types of anemias and discuss this case from the standpoint of each of these types. There are four chief types of anemia: (1) deficiency, (2) blood loss, (3) increased destruction, and (4) decreased production of blood cells. Starting with the first, I think we can eliminate deficiency as a cause in this case. Iron deficiency causes a microcytic hypochromic anemia, whereas B_{12} and folic acid deficiencies cause a macrocytic anemia. Other causes of deficiency anemia are protein deficiency and possibly vitamin C deficiency, neither of which seems applicable in this case. Experimentally anemia has been produced in animals by deficiency of pyridoxine and other B vitamins, but clinically this has not been demonstrated.

Next we can consider anemia due to an acute blood loss. I believe we can make out a good case for this type of anemia in this patient. First, there is a history of blood loss from the vagina. The description does not sound like enough blood loss to account for the whole pic-

*Lt. Comdr. Lay M. Fox, MC, USN, Medical Service.

ture. Internal hemorrhage, particularly intraperitoneal hemorrhage, could explain a good deal. The leukocytosis, presence of immature myeloid cells, normal platelet count, and normal clotting time all fit in this category. Indirect bilirubinemia is seen in hemorrhage into the serous cavities due to absorption of the blood pigments. However, the percentage of normoblasts is out of proportion to the degree of anemia. It is my impression that in acute posthemorrhagic anemia the more usual finding is reticulocytosis with perhaps a few normoblasts. Other points against a blood loss anemia are the prolonged prothrombir time and the hepatomegaly.

The third type of anemia is that due to increased destruction of red cells. We have two subgroups here, the first due to intracorpuscular causes. Under this we can list sickle cell anemia, hemoglobin-C disease, thalassemia, familial hemolytic jaundice, nocturnal hemoglobinuria, and others of the abnormal hemoglobin diseases. The patient had no past or family history suggesting any of these and there was no comment as to the presence of spherocytes, sickle cells, or target cells in her blood smear. The second subgroup is the extracorpuscular causes of increased destruction. Under this category come the acquired hemolytic anemias. First we have those acute anemias due to immune body reactions. These include transfusion reactions, the anti-Rh and anti-Kell, and other intragroup transfusion reactions. There are then the cold, warm, and blocking antibody agglutinins, and finally the cold hemolysins causing cold hemoglobinuria.

The second category of hemolytic anemia is the idiopathic hemolytic anemias without demonstrable hemolysins or agglutinins. A third type is secondary or symptomatic hemolytic anemia. This type includes hemolytic anemias secondary to known primary disease. This is most often seen in association with Hodgkin's disease, leukemia, other malignant lymphomas, lupus erythematosis, carcinomatosis, lymphomas, or liver disease.

In the forth group of hemolytic anemias are those due to infections; in this group we can include malaria, which on a world-wide basis is probably the largest cause of hemolytic anemia, and septicemia, especially that due to infection with clostridia, streptococci, and *Escherichia coli*. Finally there is the group of hemolytic anemias caused by chemicals, physical trauma, particularly heat, and vegetable and animal poisons.

In this whole group of hemolytic anemias I think we can eliminate many without further discussion. The possibilities that remain are an acute hemolytic anemia with or without hemolysins or agglutinins, and either idiopathic or secondary. We do not know whether the patient had agglutinins, as no tests were preformed for them. It would have been interesting to do tests for cold, warm, and acid agglutinins and to do a Coombs test. I think we can make out a good case for this type of anemia. The indirect bilirubinemia, leukocytosis, immature

444645 O - 57 - 6

myeloid cells, normal platelet count, and normal clotting time, all are compatible.

In addition, many items in this patient's history could be due in whole or in part to hemolytic anemia. The pain in her abdomen, pelvis, and extremities, the nausea and vomiting, shock, weakness, dyspnea, and fainting all fit. The lack of splenomegaly is against a chromic hemolytic anemia and the presence of heptomegaly is slightly unusual. The prolonged prothrombin time also does not fit a hemolytic anemia. The most important single finding against hemolytic anemia is the number of normoblasts. The same argument holds in this instance as against blood-loss anemia. I would expect reticulocytes and a few normoblasts but not 44 per cent normoblasts, especially in an anemia which is only moderate in degree.

Considering the possible primary disease with which an acute hemolytic anemia might be associated there is leukemia, and in favor of this we have an elevated white blood cell count but no other real evidence. Hodgkin's disease and malignant lymphoma are possibilities but we have no positive evidence. Liver disease is a possibility, and the patient did have a history of a bullet wound of her liver. However, I don't believe there is any backing in the history for a diagnosis of liver disease. Infections, including malaria and septicemia seem unlikely. It is true that the first admission seemed definitely associated with infection in her pelvis, but the terminal picture was not that of a septicemia. In regard to lupus erythematosis, one point in favor of this diagnosis is that the patient had a puzzling illness which caused her death. However, there is no specific evidence for lupus.

The fourth large category of anemia is that due to decreased production of red cells. The first subgroup here is that of congenital hereditary types; under this heading come many of the diseases previously discussed as hemolytic anemias. These include sickle cell anemia, thalassemia, and other hemoglobin diseases. There is decreased production as well as hemolysis in these conditions. Secondly, there is the acquired group of anemias due to decreased production. Again we can list the possible causes of an acquired anemia of this type. Infections are a possibility. In every acute infection of any degree of severity there is probably a certain amount of bone marrow depression. However, this does not account for the normoblasts and the immature white cells. Chronic disease such as nephritis can cause an anemia of this type but there is no evidence for nephritis in this case. Terminally the patient had some albuminuria and casts but on her previous admission only two weeks before she had had a normal urinalysis. Other causes are lead intoxication, x-ray irradiation, and chemical toxins. None of these seems operative in this case.

Endocrine disorders, such as myxedema and Addison's disease, can cause anemia due to decreased production of cells. In consider-

ing Addison's disease it is interesting to note that on the patient's first admission she was found to have increased pigmentation of her skin and mucosa. Then on her final admission she was in a state of shock and prostration which rapidly led to her death. It is interesting to speculate that possibly her terminal illness may have been addisonian crisis. If her primary illness was tuberculous salpingitis, her Addison's disease could well have had a related cause; this could account for many aspects of the picture. However, I don't believe that Addison's disease explains her anemia, particularly the presence of normoblasts.

Finally, the last category of anemia due to decreased production is myelophthisic anemia. The causes of myelophthisic anemia include leukemia, Hodgkin's disease, and malignant lymphoma, all of which we have mentioned previously and excluded. Myelofibrosis or sclerosis is a possible cause of this type of anemia. It would explain the anemia itself very well but would not, I believe, explain the rest of the history and the laboratory findings. The last possibility is that of malignancy with metastases to the bone marrow. I believe we can make out a very strong case indeed for this type of anemia. The blood picture fits to a "T." There is a leukemoid reaction which has also been called leukoerythroblastosis. There is an elevated white blood cell count with immature myeloid cells. The white count in a leukemoid reaction is not necessarily elevated but the presence of immature cells is constant. The presence of the normoblasts is characteristic. The platelets may be low or may be normal, as they were in this case. Frequently there is pancytopenia as a result of a myelophthisic anemia, but the leukemoid picture is a frequent one. Other points in the case which could fit this type of anemia are the pain which could have been bone pain due to metastases, the hepatomegaly, and prolonged prothrombin time and bilirubinemia which could be explained by liver metastases. The abdominal pain with motion of the legs suggests involvement of the retroperitoneal areas and the psoas muscle by tumor. And again the possibility of Addison's disease arises here due to invasion of the adrenals by tumor.

So to explain the anemia we have three main possibilities: (1) blood loss, (2) hemolytic anemia, and (3) myelophthisic anemia due to metastatic carcinoma. I think the patient probably has all three. There is a definite history of blood loss. Recent studies have shown that there probably is increased red blood cell destruction in most cases of anemia associated with metastatic carcinoma, even though it may not be demonstrable with the usual methods. And finally the third possibility, that of myelophthisic anemia due to metastatic carcinoma, I believe is the chief cause of this patient's anemia.

We then should consider the cause of her sudden death. She died shortly after the start of a transfusion. This immediately suggests that the transfusion had something to do with her death. However, when we analyze this we find that it is rather unlikely. A hemolytic

transfusion reaction which leads to the patient's death usually causes death by anuria due to lower nephron nephrosis. The death is a slow one and not an abrupt one as in this case. A second possibility of causation of her sudden death is embolism; and I think this is a very probable cause. The embolus could either have been a tumor embolus or from a venous thrombosis in the pelvis or the legs. I think the suddenness of her death is in favor of this. Bleeding as a cause of her sudden death is a possibility. This would have to be internal, and I do not think it can be excluded.

In selecting the site of the primary carcinoma, which we are postulating, we must consider the types of carcinoma which tend to metastasize to the bone. These include carcinoma of the breast, thyroid, stomach, kidneys, bronchus, and colon. An undetected primary lesion in any of these sites is a possibility. However, the patient's symptoms all pointed to her pelvis and her genitourinary tract. Carcinoma of the kidney is a possibility. Carcinoma of the cervix, I think, is ruled out by the physical examination. Carcinoma of the fundus of the uterus, carcinoma of the fallopian tube, and carcinoma of the ovary are all possibilities. She was noted to have tenderness of the right fallopian tube, so I will place the site of the primary there.

In summary, then, she had carcinoma arising in her genital organs, probably the right fallopian tube, with metastases to the liver and bone marrow. She had myelophthisic anemia due to bone marrow metastases. The terminal event was probably pulmonary embolism from a pelvic vein thrombosis.

Dr. Hill's diagnosis:

Tubal abortion

Dr. Fox's diagnoses:

1. Carcinoma of right fallopian tube, with metastases to liver and bone marrow
2. Myelophthisic anemia
3. Pulmonary embolism from pelvic venous thrombosis

PATHOLOGIC FINDINGS

Doctor Fuller:* Post-mortem examination of the body revealed skin ecchymoses around the left eye, over the right knee and right leg, on the left buttock, and around needle puncture marks in the arms. There was icterus of the conjunctivas; the endothelium of the heart and blood vessels was stained pink. Blood was present in the endometrial cavity and vagina. A moderate amount of tarry material was present in the lower small intestine and colon; there were numerous small serosal hemorrhages. A few fibrous adhesions were located in the right upper abdomen around the liver and in the lower portion of

*Capt. Roger H. Fuller, MC, USN, Chief, Laboratory Service.

the right pleural cavity. Liver and spleen were slightly enlarged, the former weighing 1,850 grams and the latter 350 grams. The lungs were moderately congested.

Except for the right fallopian tube, the gross appearance of the viscera and body cavities was otherwise normal. In the right fallopian tube at the junction of its proximal and middle thirds, was a solid ovoid mass, 2 cm in length and covered by intact serosa and attenuated muscularis (fig. 1A). Its cut surface was firm and gray, and it lay within the lumen of the tube, being attached to the mucosa by a broad base. The red hematopoietic marrow of the lumbar vertebral bodies was largely replaced by nodular gray tissue (fig. 1B).

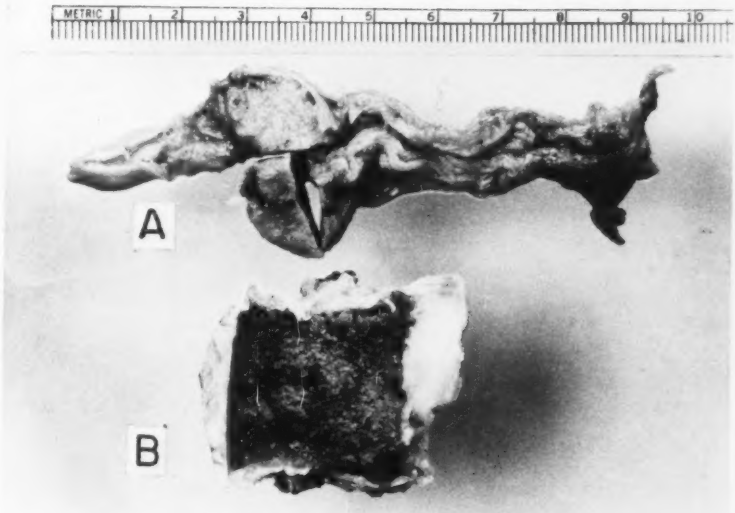


Figure 1. (A) *Right fallopian tube containing carcinoma at junction of proximal and middle thirds.* (B) *Lumbar vertebral body containing nodular metastatic tumor. (Photograph by Jim England)*

Microscopic examination revealed papillary adenocarcinoma of the right fallopian tube (fig. 2) with widespread hematogenic dissemination. Plugging of pulmonary arteries and alveolar capillaries by embolic tumor cells was particularly widespread (figs. 3 and 4). Intravascular tumor emboli were noted in most of the parenchymatous organs. There was massive replacement of hematopoietic tissue by tumor in sections of lumbar vertebral marrow (fig. 5). Extramedullary hematopoiesis was noted in the spleen. The uterine cavity was lined by menstrual endometrium, as would be expected with the usual cycle of 28 to 30 days.

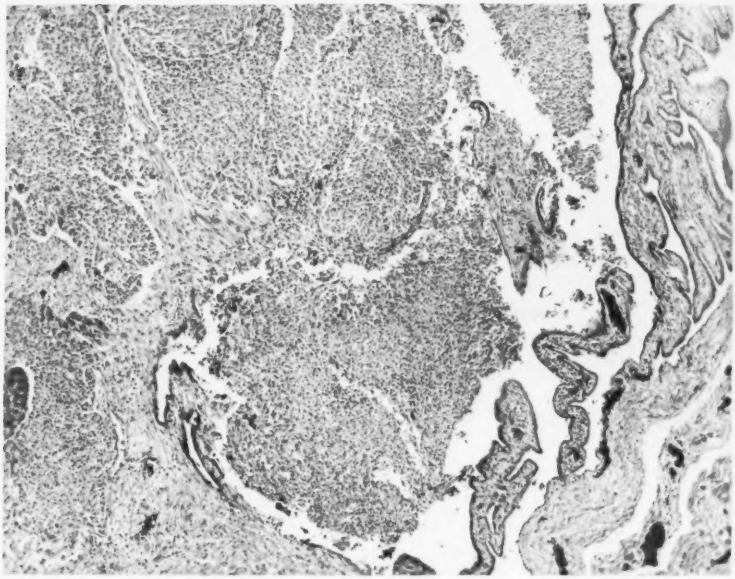


Figure 2. Photomicrograph of right fallopian tube showing papillary adenocarcinoma and tubal mucosa. (× 50) (Courtesy of the Armed Forces Institute of Pathology)

Figure 3. Photomicrograph of lung showing tumor emboli in pulmonary arteries. (× 165) (Courtesy of the Armed Forces Institute of Pathology)

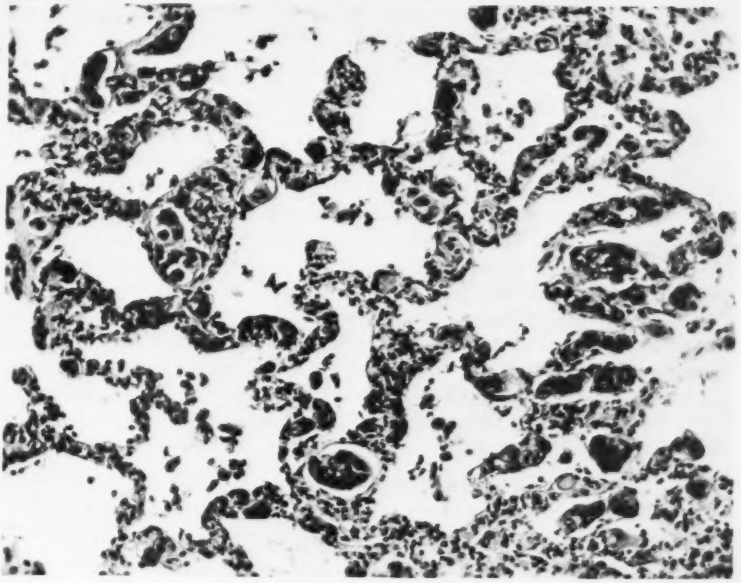


Figure 4. Photomicrograph of lung showing tumor emboli in alveolar capillaries. (× 165) (Courtesy of the Armed Forces Institute of Pathology)

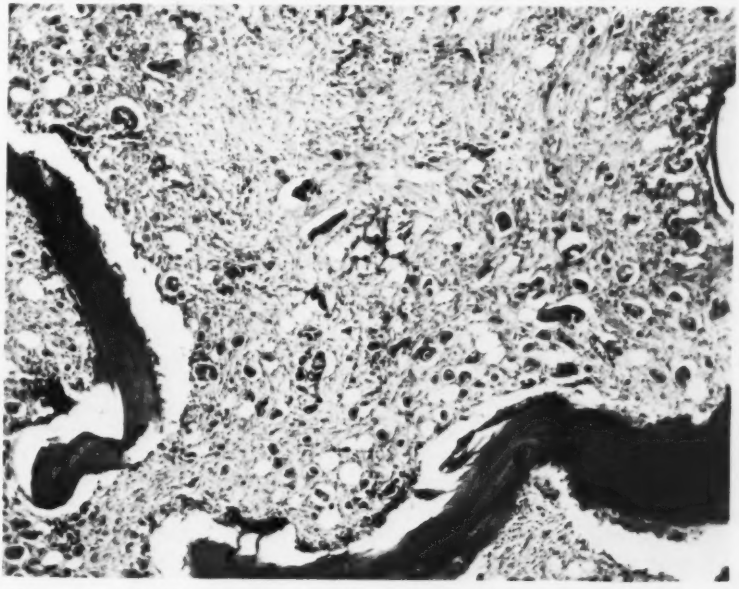


Figure 5. Photomicrograph of lumbar vertebral body showing replacement of hematopoietic marrow by metastatic tumor. (× 56) (Courtesy of the Armed Forces Institute of Pathology)

Pathologic diagnoses:

1. Adenocarcinoma, right fallopian tube, with metastases to bone marrow, liver, lungs, spleen, hypophysis, adrenals, and ovaries.

2. Myelophthisic and hemolytic anemia

COMMENT

Doctor Kuehn:* Anemia is one of the common manifestations of cancer and other neoplastic diseases.[1] The incidence of anemia in patients with cancer obviously depends in large part on the type and stage of progression of the neoplastic process. In general, anemia is usually associated with the more advanced stages of the disease, and even then is most frequently mild or moderate in degree. Symptoms due to anemia, however, may be the presenting complaints of the patient with cancer, and the anemia may be severe.

We may classify anemias occurring in cancer patients as follows: (1) iron deficiency anemia, (2) megaloblastic anemia, (3) myelophthisic anemia, (4) hemolytic anemia, and (5) myelopathic anemia.

1. *Iron deficiency anemia.* Iron deficiency anemia caused by chronic blood loss from ulcerative neoplastic lesions, particularly of the gastrointestinal tract, is commonplace among patients with cancer. The usual findings are characteristic: hypochromia, microcytosis, variation in size and shape of the mature erythrocytes, normoblastic hyperplasia of the bone marrow, and a low serum iron.

2. *Megaloblastic anemia.* While macrocytosis may be a feature of the hemolytic or myelophthisic anemias associated with neoplastic disease, the association of a truly megaloblastic anemia with cancer is unusual. It is virtually limited to gastric carcinoma. The high incidence of gastric carcinoma in patients who have had pernicious anemia is well known.

3. *Myelophthisic anemia.* While the anemia associated with disseminated cancer cannot usually be ascribed to replacement of the bone marrow by the neoplastic process and its accompanying fibrosis, such replacement does occasionally occur and gives rise to a distinctive hematologic picture which is indistinguishable from that observed with bone marrow replacement due to other causes. The distinctive characteristic of this type of anemia is the presence of immature granulocytes and of nucleated erythrocytes in the peripheral circulation. These are claimed to arise from the foci of extramedullary hematopoiesis. The extent of bony involvement varies from minimal

*Lt. Ned N. Kuehn, MC, USN, Laboratory Service.

to extensive, without apparent relation to the hematologic manifestations of myelophthisis. The hematologic abnormality appears unrelated to the type of osseous metastasis, that is, either obteoblastic or osteolytic, or both, or to the duration of the lesions. The nonnucleated erythrocytes in the peripheral blood are normocytic or slightly macrocytic. They show polychromasia, basophilic strippling, and variation in size. A moderate reticulocytosis is common. Because of the reticulocytosis, the frequent splenomegaly, and the occasional presence of jaundice, the possibility has been suggested that the anemia may be hemolytic in nature. The usual tests for red cell and serologic autoantibodies are almost invariably negative. Erythrocyte survival studies, however, do show a decreased survival of autogenous and homologous red cells, but it is not of such a degree as to account entirely for the anemia. Consequently the deficit in erythropoiesis appears to be of primary importance. This deficit seems reasonably ascribable to marrow failure since bone marrow aspirations usually yield very scanty, hypocellular material.

4. *Hemolytic anemia.* Classical, acquired hemolytic anemia, with acholuric jaundice, marked reticulocytosis, spherocytosis, and autosensitization of the red cells is relatively common in chronic lymphatic leukemia and the malignant lymphomas. It has also been described in ovarian teratomas, but such an anemia is rare in the carcinomatous diseases. Only a dozen or so cases are reported in the literature. Almost all have been observed in association with widespread bone marrow metastases. The primary site of cancer has usually been the stomach, but it has also been reported for the bronchus, pancreas and large intestine. In several of the cases the manifestations of hemolytic anemia were so prominent that the patients were considered to have idiopathic acquired hemolytic anemia before a diagnosis of cancer was established. The relationship of this syndrome to the more usual myelophthisic anemias is not clear. Both have in common the finding of cancer cells invading the bone marrow, and in both there is an increase in the rate of red blood cell destruction. In hemolytic anemia, however, the evidences of increased destruction are much more obvious, and there are clear evidences of considerably increased erythrocyte production, as manifested by reticulocytosis, which is usually well above 10 per cent and may be as high as 80 per cent, and by the normoblastic hypercellularity of the bone marrow.

The pathogenesis of this hemolytic anemia remains speculative. In only one recorded case was there evidence of autosensitization or serologic agglutinins, and even this case is not well established, since the apparent autosensitization may have been the consequence of transfusion. It has been suggested by Waugh[2] that the stagnation of blood in marrow sinusoids be-

hind tumor emboli might lead to "hemorrhagic extravasations" within the marrow and thus contribute to an apparent hemolytic anemia. It has been reported by Gross[3] that extracts of carcinomatous tissue may lyse homologous erythrocytes. It is conceivable, then, that stagnation of blood in the sinusoids might expose the red cells for more or less prolonged periods to the lysins associated with the cancer cells, and thus lead to intense hemolysis.

5. *Myelopathic anemia.* When the preceding types of anemia associated with cancer are eliminated, there are still large numbers of patients with cancer who have an otherwise unexplained anemia. The majority of these patients do not have bone marrow metastases. It is characteristic of this type of anemia that it is mild or moderate in degree. The erythrocytes are normochromic, or occasionally slightly microcytic and hypochromic. Reticulocytosis is within normal range or slightly elevated. The bone marrow appears normally cellular, or it may show a mild normoblastic hyperplasia.

As in the anemia of infection, with which the myelopathic anemia or cancer is apparently identical, there appears to be an abnormal metabolism of iron. Serum iron levels tend to be low, as do the concentrations of iron-binding globulin, yet the iron stores of the body are higher than normal. The mechanism of the diversion of iron from the plasma to the reticuloendothelial system is not understood. Recent studies in the last few years have shown a decreased survival of normal erythrocytes transfused into patients with this anemia. Other studies indicate that the increased rate of erythrocyte destruction is due to premature aging of the normal erythrocytes in the patient's circulation rather than to some serologic or tissue factor destroying red cells at random. Regardless of the mechanism of red cell destruction, there are apparently other factors occurring in this anemia. Studies indicate that in patients with this type of anemia, the bone marrow does not compensate to the extent that the normal bone marrow can.

Doctor Lucas:* In less than 5 per cent of reported cases of carcinoma of the fallopian tube has a correct preoperative diagnosis been made.[4] Pain, often colicky in nature, and localized to one lower abdominal quadrant, is usually present. Rapid distention of the tubal wall by tumor has been postulated as the cause of the early occurrence of pain. Reported survival rates have in general been poor, varying between 0 and 40 per cent.

---

*Lt. William E. Lucas, MC, USN, Obstetrics and Gynecology Service.

REFERENCES

1. Ley, A. B.: Mechanisms of anemia in cancer. *M. Clin. North America* 40: 857-870, May 1956.

2. Waugh, T. R.: Hemolytic anemia in carcinomatosis of bone marrow. *Am. J. M. Sc.* 191: 160-169, Feb. 1936.

3. Gross, L.: Destructive action of human cancer extracts on red blood cells in vitro. *Proc. Soc. Exper. Biol. & Med.* 70: 656-662, Apr. 1949.

4. Israel, S. L.; Crisp, W. E.; and Adrian, D. C.: Preoperative diagnosis of primary carcinoma of fallopian tube. *Am. J. Obst. & Gynec.* 68: 1589-1593, Dec. 1954.

SIMPLE IDEAS PRODUCE GREAT DISCOVERIES

The clinician, as he looks with some envy at the beautiful, peaceful laboratories of his colleagues in the basic sciences should recall the lowly origin of many of the most important medical discoveries. Although Jenner was the first to demonstrate the potentialities of vaccination for smallpox, the procedure originated in some pre-historic age devoid of gleaming laboratories and scientific gadgets. Withering listened to the tales of an old woman's secret remedy for dropsy, identified foxglove, and thus discovered digitalis. Many years later, Vogl noted that nurses, uselessly charting the urinary output of patients, regularly recorded an increase after the administration of an organic mercurial to syphilitic patients; thus was the diuretic effect of the mercurial drugs discovered. Sir James Mackenzie studied the patients who came to him and wrote his classic treatise on heart disease. Lord Lister grasped the significance of the discoveries of Pasteur, instituted anti-sepsis in the operating room and founded modern aseptic surgery. George Minot and William Murphy...fed liver to patients with pernicious anemia, made a completely new discovery recorded in case reports, won the Nobel Prize, and added years to the lives of untold numbers of men and women. The methods used by these men were all simple but *ideas* were present, ideas arising in prepared minds. In such ways, with persistence and perseverance, the clinician day by day can help to extend our knowledge and to push slowly back the borders of the unknown.

—WALTER L. PALMER, M. D.
in *Annals of Internal Medicine*
p. 387, Sept. 1957

ARE WE OVERLOOKING THE EFFECTS OF COMBAT EXPERIENCE IN SOME OF OUR PSYCHIATRIC CASES?

CHARLES S. MULLIN, *Captain, MC, USN*

IN A RECENT article by McMullin there is the following intriguing statement:

"A rather striking phenomenon observed in our [naval psychiatric] hospitals during these past several years (1951 through 1954) has been the rarity of combat neuroses and the infrequency of any type of psychiatric disorder that could be correlated with combat situations. Those of us who saw hundreds of such cases in World War II now are hard pressed to find even one or two cases for teaching purposes."[1]

Can it be that we are overlooking the importance of combat experiences in the initiation and perpetuation of psychiatric disability as seen in our military practice? There does appear to be a curious diagnostic blind spot, particularly among the more "analytically oriented" of our fraternity, in considering the possible influence of combat experiences in determining the development of a psychiatric disorder where the combat experience may have occurred many years before.

I have tried to be disciplined in my evaluation of what constitutes evidence of the psychotraumatic effects of combat. If a man has been exposed to intimate combat experience, and thereafter, intermittently or continuously, has suffered a definite personality change characterized by such manifestations as depressive ruminations about these experiences, acoustic hypersensitivity, more or less severe startle reaction to sudden noises—particularly those noises resembling the sound of gunfire, explosions, et cetera—a phobic avoidance of stimuli suggestive of the combat situation, nightmares of combat scenes, marked irritability often associated with explosive rages and a general reduction of executive effectiveness, then some respect should be shown to the possibility that the traumatic effects of the experiences themselves are still operating. The fact that

From U. S. Naval Hospital, Camp Pendleton, Calif.

over the years a complicated neurotic superstructure relating to secondarily engendered conflicts has been erected, need not obscure the traumatic "core" symptoms.

The cases of three patients who happened to be patients in my own small service at the same time illustrate the points I am trying to make. They were three Marine noncommissioned officers unknown to one another, who had been admitted with varying presenting complaints and whose cases had been worked up in great detail, each by a different psychiatrist. In each instance, the psychiatrist was competent; in one case he had had 8 years of experience in the field. Nonetheless, the importance of combat experiences in creating serious alterations of adjustment was totally missed in each of these cases until late in hospitalization. In two instances, the possibility that combat experiences were important was brought to our attention by our Psychiatric Social Service Worker, who happened to take an additional history. In the other instance, while endeavoring to assist the psychiatrist in charge of the case to understand the origins of the patient's illness, I suggested the possibility that combat experiences were important.

Understanding the role of traumatic factors is important not only to diagnosis, but also, very emphatically, to adequate treatment.

Case 1. A sergeant was admitted because of "memory loss associated with alcoholism and unauthorized absences, plus periods of extreme depression, with suicidal ruminations over the consequences of unauthorized absences." The present illness, as recorded by the psychiatrist, contained no reference to combat and neither did the past history, which happened to be singularly free of evidences of preservice psychiatric abnormality. In fact, this particular patient, on the surface at least, seemed to have been exceptionally well adjusted prior to combat. However, the diagnostic impression was "A mixed character disorder with strong homo-erotic and latent passive dependent factors." A routine history was obtained by our social worker from his family, who volunteered the information that the patient had shown a marked personality change on his return from Korea in 1951. In addition to other manifestations, he showed a marked startle reaction, phobic responses to reminders of combat, and in the past at least had shown the typical dream life.

The medical officer in charge of the case, with his attention thus transiently directed to the combat experience, asked the patient about these experiences and was rewarded by a spontaneously cathartic outpouring which resulted in some apparent symptomatic improvement. (It is interesting that none of the three patients *volunteered* any information about their combat experience or its apparent psychologic effects on them.) Thereafter, for two months of hospitalization, there was no reference to combat or its effects. No further abreactive at-

tempts were made. Shortly before his discharge, the patient went AWOL and claimed amnesia for his absence. The doctor's progress note almost, but not quite, hits the mark: "The patient's last recollection was of being bumped from behind by another car while driving his own. 'The loud bang (of the collision) took me by surprise.' 'I felt very shaky and tense, and I could not understand why such a little bump should excite me so much.' The patient feels that something in the accident was reminiscent of his past, but cannot pinpoint his feelings in this regard." Anyone who has seen a violent dissociative response of a combat neurotic under Amytal (brand of amobarbital), when a loud noise is deliberately made by the therapist in the hope of precipitating abreaction, may have some idea of what happened in this case.

Case 2. The second patient, also a sergeant, was admitted to the hospital with diagnosis undetermined, hypertensive vascular disease. A history taken by the Medical Department contained no reference to his 11 months in combat, which included some particularly harrowing experiences. Likewise, an extensive neuropsychiatric consultation made no reference to these overseas experiences. He was transferred to the Psychiatric Department because of suicidal feelings and "tension." A psychiatric history of the present illness and an extensive past history, which incidentally also indicated a good-enough preservice adjustment, contained no references to the effect of combat, except that it was mentioned that he was the recipient of a Bronze Star. An alleged suicidal attempt while in Korea was described, this being attributed largely to family difficulties at home. Furthermore, a work-up at a naval hospital at the time of this suicidal attempt failed to mention anything about combat. The diagnostic impression was schizoid personality. Nowhere in the progress notes that succeeded was there any reference to combat or its effects. Psychologic tests were reported as evidencing "depressive components in a passive-dependent personality, with little likelihood of genuine suicidal attempts." A three-page social service history taken by our worker some time after the patient's admission to the service, revealed that "when he returned to the States in July 1951, he seemed to have many symptoms suggesting an acute anxiety state, had frequent combat nightmares, and would awaken sweating and anxious." This type of dream, plus morbid "daydreaming" about his experiences with particular reference to the fact that he was one of 16 survivors of an outfit that had originally had "several hundred" personnel, had continued with various remissions and exacerbations until the present time.

Case 3. The case of a third sergeant happened to be worked up by two different medical officers, because of reassignment of one of them. Each doctor took a complete history. In the first anamnesis, there was no reference to combat. The second and very extensive history described the man's combat experience but made no mention of his reaction to these experiences. In one case, the chief complaint

was recorded as follows: "History of gradually deepening depressiveness and unworthiness in recent months in apparent relationship to an affair with a married former sweetheart, now in the process of divorce." In the other write-up, the principal complaint was indicated as nervousness and "trouble in public speaking." Finally, our capable social worker this time missed the import of combat entirely and focused exclusively on current problems. This is not to suggest that the solution of current problems may not be of great importance; the fact remains that these problems had developed and been augmented because of the existence of a "traumatic" neurosis. The patient manifested a great deal of anxiety and hostility, and strenuous attempts were made by his medical officer to relieve him of these symptoms by discussion of current-life difficulties, without much effect.

Finally, 6 weeks after admission, his medical officer asked me to interview the patient with a view to offering therapeutic suggestions. Basically the sergeant appeared to be suffering from the effects of a combat-induced "traumatic" neurosis, characterized by marked anxiety associated with extreme autonomic overaction, extreme irritability, outbursts of rage, acoustic hypersensitivity, marked startle reaction, inability to tolerate discussion of painful experiences in Korea, and continued dreams of combat experiences.

At this point the question might be asked, "Once the conclusion has been reached that combat experiences have made a contribution to the development of a man's psychiatric illness, does this make any difference in the therapeutic management of the case?" In this case, over a period of about 6 weeks a total of 6 abreactive seances were carried out, using Pentothal Sodium (brand of thiopental sodium). In each instance there was violent abreaction of specific combat experiences, associated with extreme terror and guilt. The patient relived these experiences in the present tense and in minute detail and with electrifying intensity. After each session, there appeared to be some improvement in symptoms. Headaches that he had complained of disappeared, anxiety became markedly reduced, outbursts of irritability entirely disappeared, dreams of combat cleared up, appetite was restored, and the patient stated, "I haven't felt as good as this for years." This man was ultimately discharged from the service and a chance follow-up 6 months later revealed that he had held his improvement.

Although not germane to the purposes of this presentation, it is interesting to speculate why these abreactive sessions seem to be associated with marked improvement. Is it some form of nonspecific "shock" treatment, the simple effects of repeated violent expression of repressed emotion, the significance of the tender and solicitous laying-on of hands involved in these 6 sessions, or is it the opportunity vigorously to ventilate the incubus of a long-festering guilt and terror experience in the presence of a reassuring and guilt-relieving authority?

DISCUSSION

Over years of practice in military hospitals, I have encountered many "hidden" traumatic neuroses, or at least neurotic conditions, where the effect of the traumatic experience is important in understanding the present total picture. Our current "analytic-psychologic" orientation leads us to neglect the possibility that a single external "shock" event (usually of the terror-grief-guilt variety), or a series of such events, can precipitate a particular type of neurotic picture, which, irrespective of any complex, secondary, acquired neurotic superstructure, continues to represent the core of the neurosis. In any event, psychiatric education, in this country at least, leads us to think largely in terms of gradually unfolding dynamic patterns. We may be willing to concede that an emotionally "shocking" incident in childhood may leave its specific imprint on the adult, but if we pay any deference at all to the effect of such catastrophic experiences occurring in later life, it is only in terms of their effect in tipping an already precarious psychic balance or in terms of their symbolic significance.

CONCLUSIONS

The effect of combat experiences in the development and perpetuation of neuroses in a military hospital population is probably greater than generally assumed.

There appears to be a tendency for medical officers trained in the "analytic-psychologic" tradition to overlook the importance of the effect of old combat experiences as a determinant of current symptomatology.

REFERENCE

1. McMullin, J. F.: Functions of naval neuropsychiatric treatment center. *U. S. Armed Forces M. J.* 8: 91-102, Jan. 1957.

DRIED SMALLPOX VACCINE

"Dried vaccine used without refrigeration under adverse climatic and topographic conditions proved to be a satisfactory immunizing agent in Isfahan, Iran. The percentages and types of reactions in a sample of 1,094 individuals were comparable to those obtained with glycerinated vaccine kept under refrigeration."

—HARALD FREDERIKSEN, M. D.
JAMES P. SHEEHY, B. C. E. in S. E.
in *Public Health Reports*
p. 172, Feb. 1957

A MODIFIED CHILD GUIDANCE PROGRAM IN AN AIR FORCE HOSPITAL

DOUGLAS POWERS, *Major, USAF (MC)*
SAM WASHINGTON, *Captain, USAF (MSC)*
JOE LUCERO, *Staff Sergeant, USAF*

A **THREE AND ONE-HALF-YEAR-OLD** Japanese-American adopted girl, who has lived for five months with her present parents, will not ask for basic needs such as food and water. She will neither urinate nor have a bowel movement unless urged by her mother. She is very much afraid of her father, and when either parent changes the tone of voice the little girl trembles and becomes nervous. The child cannot carry out simple directions and does not play well with other children of her age.

A nine-year-old boy has been wetting the bed almost every night for about eight months. During this time he has been nervous, has had frequent nightmares, and has been upset in general. He "sasses" his parents, his school work in the third grade has fallen off considerably in recent months, and he has been a management problem in school because of frequent fights.

An eight-year-old girl is doing poorly in school. She daydreams much of the time, fights with other children, and is always doing things to attract attention. Sometimes she is very argumentative; at times her behavior is babyish. She will not obey her parents and fights incessantly with a younger brother.

A six-year-old boy is inattentive in the classroom, exhibits unusually aggressive behavior, and does poor academic work. He is aggressive toward animals around the house, lassoing the family cat by the neck and swinging him around in mid-air. He sets snares for rats and then sets fire to their hair while the rats are still alive. There is an unusual amount of rivalry with other children in the family.

Telephone calls day after day describing situations similar to the above alerted the psychiatric service of this hospital to the need for giving help in resolving some of the problems. These so-called behavior maladjustments of childhood presented themselves in numerous ways; they involve shy and withdrawn chil-

From 6407th U. S. Air Force Hospital, APO 323, San Francisco, Calif.

444645 O - 57 - 7

dren, over-aggressive children, children who swear profusely, children who set fire, children who steal, children who fabricate, children who are involved in disturbing sexual activity, children who persist in thumb-sucking, and children who are frankly schizophrenic. In attempting to analyze the general situation in the Far East, many factors appeared to be important in the pathogenesis of these problems.

FAMILY RELATIONSHIP IN NEW ENVIRONMENT

We are concerned with families who have been transplanted from their home environment to one that is unfamiliar to most of them. Some of the families come to this new environment willingly, and others come reluctantly. Parents and children leave friends and relatives behind and find themselves one morning in a strange land where customs are different, where they know no one, and where the process of establishing new friendships has to begin all over again.

Often children leave school in the middle of the year. After being out of school for several weeks they start in a different and unknown setting, and some of them find the transition extremely difficult.

In most instances, families begin their lives in this environment in private rental houses where communication with natives is difficult because of language barrier and where communication with fellow countrymen is hampered because of lack of telephones and transportation.

The father frequently precedes the rest of the family by several months, and may during that time establish some kind of extramarital relationship with local women. On arrival the wife often suspects or fantasies such relationships; in either case her security is threatened in varying degrees. Divorce may be talked about openly, and sometimes it appears that the children are the only forces keeping the family intact. At times the family is able to have a full-time maid and the parents take advantage of this seemingly fine state of affairs to leave most of the direction of the children to the maid. Conjunctively with this, the base activities for children sometimes are utilized to excess, the children being pushed into the activities without needed parental guidance.

The nature of the father's work occasionally keeps him away from home for unnatural lengths of time, and this is cause for concern in the family.

Thousands of miles separate the families from their relatives. The distance accentuates normal worry and anxiety about the health and welfare of those who mean much to them.

These factors are but a few of the multidimensional influences affecting service families in the Far East. Some of them arrive in the theater with already disturbed family relationships, and one additional factor or a combination of factors may be instrumental in precipitating still worse relationships that are reflected in the disturbed behavior of a child.

The disturbance in the family becomes cyclic—the father is unhappy, the mother is unhappy, and the child is unhappy. This turbulence often is reflected in reduced effectiveness of the father as a member of the Air Force. With the current and rightful emphasis on total family care in the Air Force, it was considered important that an attempt be made to work with these problems in such a manner as to maintain and facilitate the integrity of the family unit. Consequently, a plan was developed to establish a child guidance program by which both the child and his parents could be assisted.

STANDARD CHILD GUIDANCE CLINIC

The usual child guidance clinic of the general type described by Scheibel, Zehrer, and Chambers[1] and by Montague and Thompson[2] is operated in a fairly definite and well-established pattern. The procedures are time consuming, automatically limiting the number of children who can be seen. Professional personnel represented are clinical psychologist, psychiatric social worker, and psychiatrist. When a child is referred to such a clinic, a certain routine is followed: Initially the social worker will conduct an intake interview with the parent or parents; then the child may be seen several times by the psychologist for a battery of testing, and the physician may observe the child in the play therapy setting before all of the data collected are discussed and analyzed at an intake conference. At that time a decision is made as to who will be the child's therapist and who will work with the parents. Then a series of appointments are made, the frequency varying from once to several times a week. Following each therapy session with the child and his parents, brief discussions are held between all the professional personnel concerned with the sessions just concluded. Periodically, staff conferences are held for review of the case in its entirety.

THE SIMPLIFIED PROGRAM

Such an approach to the treatment of emotional problems in children is ideal, but it was obvious from the first that we could not follow an ambitious program because of many limitations, chiefly in available time and personnel. It was impossible to predict very far in advance how many of the three disciplines (those of the clinical psychologist, psychiatric social worker, and psychiatrist) would be represented on the staff; and whether, when all three are represented, all would be interested in working with the problems

of children. Only a fraction of our time could be devoted to such a program because of a large outpatient service for military personnel and dependents, in addition to a 30-bed ward for the military—all of which are time and energy consuming. What could be done under the circumstances? We declared our interest in working with such problems insofar as time and personnel permitted, a play-therapy roomwas equipped, and we were in business.

The process had to be streamlined, and this is essentially our operation at present. The social worker or social work technician interviews the parents as soon as possible after the initial referral, obtaining as much background data as possible and recording his observations of the parents and their interaction during the interview. A subsequent appointment is made for the parents and child to see the physician. At this time the child is observed in the playroom for about 30 minutes, and then the parents are interviewed briefly. On the basis of the data available the physician conducts a kind of "summing up" with the parents.

At this point one of several things may happen:

1. It may develop that the problem is not a real one and that what is needed is for someone to explain to the parents that the behavior of the child is normal for his age.

2. It may be that the problem is not severe enough to require frequent visits to the clinic. In this case, the physician points out to the parents during the "summing up" what factors are important in the particular situation and makes suggestions. The parents are sent home to carry out these suggestions for four to six weeks, after which they are to call us. Many times the problem is resolved in this length of time. If not, parents and child are brought back for another appointment, more data is gathered, and again certain suggestions are made in view of whatever has transpired in the interval. They are asked to report again in four to six weeks, and if at the end of that time appreciable progress has not been made, we take them on more frequently. In this case the parents are usually seen by the social worker while the physician works with the child. Informal discussions are held among the professional personnel from time to time so that data can be exchanged and evaluated.

3. In some instances it is obvious from the initial visit of the child and his parents that the matter is serious and will require a more intensive approach. Appointments are made at weekly or more frequent intervals for the child to be seen in the playroom while the parents are being seen by the social worker.

4. In the rare situation that is considered inoperable under the circumstances, it is recommended that the family be returned to the United States where the needed assistance can be obtained.

If appropriate, we make contact with some civilian agency in the United States where the parents can seek help.

DISCUSSION

The types of problem situations referred to the clinic may be (1) behavior problems such as excess timidity, fearfulness, and seclusiveness—problems manifested generally in the personality; (2) problems manifested in socially unaccepted behavior such as fighting, bullying, temper tantrums, disobedience, exhibitionism, stealing, cruelty, and sexual difficulties; (3) problems of habit formation such as enuresis and speech defects; (4) problems of development such as mental retardation, mental acceleration, and difficulty in reading and spelling; and (5) psychosomatic problems such as urticaria and asthma.

Our preliminary observations regarding the need for a child guidance program have been substantiated. There is no well-defined yardstick by which to measure the success of such a program, but no one can overlook the disappearance of disturbing symptoms in a child and better integration of the family as a unit. There is considerable evidence to suggest that such a program has contributed appreciably to the morale and efficiency of the families who have used the facilities of the clinic. The program has been received enthusiastically by teachers and school nurses. Further evidence of the acceptance of such a program is the ever-widening geographic area from which patients are referred.

The modified approach that we have described has worked effectively in civilian practice and is considered adaptable to the needs of the Air Force setting at this overseas hospital. Here the work must be accomplished by limited personnel operating under the handicap of a heavy patient load, which precludes, particularly in an overseas area, the operation of a child guidance clinic along classical lines.

REFERENCES

1. Scheibel, A. B.; Zehrer, F. A.; and Chambers, R. E.: Establishment of child guidance clinic in Army general hospital. *Bull. U. S. Army M. Dept.* 9: 449-457, June 1949.

2. Montague, E. K., and Thompson, W. W.: Child guidance clinic in Army hospital. *U. S. Armed Forces M. J.* 7: 1753-1766, Dec. 1953.

"The use of salicylates appears to increase the frequency of bleeding in patients with proven peptic ulcers."

—J. J. KELLY, Jr., M. D.
in *American Journal of Medical Sciences*, p. 127, Aug. 1956

OBSERVATIONS ON THE DYNAMICS OF LEADERSHIP

A Methodologic Approach

DENNIE L. BRIGGS, *Lieutenant, MSC, USN*
IRVING D. BERG, *Lieutenant, MC, USNR*

WHILE STATIONED in a large naval general hospital for the past two years, we were impressed by the interaction among various staff members; between medical, surgical, and psychiatric patients; and between staff and patients. In addition to the medical staff, consisting of career and reserve medical officers, there were medical administrators, officers of the allied medical sciences, nurses, and hospital corpsmen, all with distinct symbols as to their rank either in military or civil service. The patients were officers and enlisted personnel, both men and women, of various ranks and rates, in addition to dependents.

We often were struck by the interaction that took place in so many different ways and on so many different levels, particularly in the formation of groups within the military structure. Often, in the hospital, extraordinary situations occurred that involved personnel with higher or lower professional status and that called for personal and social adjustments not encountered elsewhere in the military. Even within groups formed spontaneously, there was the factor of interrank relationships, where social status was not recognized as easily, but where prescribed behavior was rigidly observed.

In the course of observations made while teaching, conducting group therapy, and holding ward staff meetings and discussion groups, we were impressed by the development within the groups of a certain hierarchy that seemed to establish itself automatically. We also were aware of what seemed to be the assumption of positions of leadership, "followership," and "going alongship" by members of the groups. We became interested in how the language, perspective, and viewpoints varied among the dif-

Presented at the annual meeting of the American Sociological Society, Washington, D. C., 1955.

From U. S. Naval Hospital, Oakland, Calif. Lt. Briggs is now assigned to U. S. Naval Hospital, Navy No. 3923, FPO, San Francisco, Calif.

ferent groups. We thus became curious as to what went on in these "natural groups" and what factors took place in the establishment of the hierarchical arrangements within the groups, in addition to finding out more of the purposes served by these relationships.

Noting the observations made by Parsons,[1] Caudill and associates,[2] Stanton and Schwartz,[3] Fox,[4] and others concerning the participation of the hospital as a social system in the treatment and course of illness, we were interested in developing more systematic methods of observation, particularly of the groups that formed and of the dynamic interaction that occurred within these groups.

Any particular group that was not formed artificially by calling together various individuals as subjects into a nonmeaningful group became a subject for investigation. We observed the patients getting together themselves, hospital corpsmen working together, the staff of a particular ward, et cetera; thus our studies represent particles of the vastly complex interaction going on in a military hospital.

METHODOLOGY

In this article our main interest is to present a methodologic approach that was designed to integrate sociologic, psychologic, and psychiatric theory and technic. We wished to recapture the social setting of the particular group under study with a minimum of disruption by research procedures. Each technic was chosen as one with which the members were familiar, or one that contributed to the atmosphere being investigated. The groups selected were "natural groups" in the sense that the members themselves had gotten together as friends or associates, or were working together in a staff-patient relationship. Those groups studied had close contact with the investigators in a teaching or therapeutic relationship. It was our belief that the spirit of co-operation exhibited contained little or no acquiescence. The technics themselves were chosen and adapted to keep the setting as natural as possible within the framework of the hospital.

In considering the feasibility of adapting acceptable research procedures from the various disciplines to contribute to a holistic approach, we chose those methods that we believed were sound experimentally and acceptable to our participants. Before using any procedure with which the group was not familiar, its use was discussed and worked through in the group. For example, when tape recordings were used—a procedure familiar to most of the participants—group members operated the recording apparatus themselves and were allowed to listen to the playback at any time.

We selected the Rorschach test because it is an accepted technic in clinical psychology, was a familiar procedure at the hospital, yet presented a relatively unstructured stimulus that most of the group members had not actually seen previously, although all knew it was a device to reveal material unknown to the testee. Thus some "test anxiety" was mobilized as part of the experimental procedure. This was utilized and accounted for, as we shall discuss presently.

The Rorschach test was individually administered, and was interpreted in the traditional manner as presented by Beck.[5] Later, a modification was introduced that had not to our knowledge been used previously. In one of the group sessions, it was announced that the next session would be devoted to an experiment. In the following session, the Rorschach cards were shown to the group as a stimulus for discussion. The members were asked what they saw as a group in each card in an allotted time, and their impressions were recorded. Immediately following this session, their individual impressions were taken again to measure any possible aftereffects of the interaction that had occurred.

The Rorschach test thus was used clinically to obtain a personality description of each member and of the group as a whole, in addition to being used thereafter as a somewhat familiar stimulus for discussion. Its unique feature in this experiment, however, was that in a sense we also obtained a measure of the "group personality," together with an estimate of both individual and group dynamics in operation. We saw an individual's private thoughts as well as those he voiced publicly and the manner in which he operated in a group. In addition, we watched similar interaction for the group as a whole. An individual might see a percept that through previous research has been established as one indicating a particular disturbance in psychic functioning, and introduce this percept into the group discussion. If the percept was ego-alien or not acceptable to the group, disagreement might ensue and the individual would be forced to make a stand or withdraw. Through later content-analysis of the percepts, we were thus able to gain insight into the particular meaning of the individual's thinking, both privately and in the group setting.

Group sessions were tape-recorded and transcribed. The interaction was charted according to a modification of Bales' "Interaction Process Analysis,"[6] momentarily disregarding interpretation of the psychologic meaning of the test responses.

At another session, the groups were asked to make various choices of the members' behavior, utilizing Tagiuri's "Relational Analysis" technic.[7] Each member was seen individually for psychiatric interviews and an associative anamnesis was taken.[8] Impressions also were noted from the content of the group meetings (*i. e.*, reactions to lectures, feelings expressed in therapy

sessions, et cetera) by the investigators who were meeting with the groups.

OBSERVATIONS

The observations presented here are tentative and warrant extremely cautious interpretation and generalization. We have not yet subjected them to statistical verification and have not applied them outside the clinical setting of the hospital. They form the basis of a number of hypotheses that we are investigating.

We observed through the interaction and the Rorschach responses that there were many personal feelings and ideas present which a person would not voice publicly (*i. e.*, his private ideas), and others that a person could not reveal even to himself, as he was not conscious of their existence. Our research thus far brings out the following points regarding the interaction of the group and the dynamics of the leader in a spontaneous social setting:

(1) In group discussions, the members were selective in the material they brought forth, and tended to reveal those private ideas and feelings least disturbing or alien to the group; *i. e.*, they revealed most often those ideas that were more acceptable to the group or "group syntonic."

(2) Where some of the group-apparent material coincided with ego-alien material (*i. e.*, material which was unacceptable to the ego and therefore *not* previously capable of being integrated by the ego) the ego-alien material became integrated into the individuals' experience and following the group experience, they could safely add these ideas to their conscious repertory.

(3) The leader, as obtained by sociometric choice, was the one who was more capable of incorporating by his ego-integrative capacity ideas that came from the group, and possibly ideas that he could not previously have brought to acceptance; *i. e.*, those that might have been unacceptable to him before. Interestingly enough, this factor appeared to operate in groups of psychiatric patients as well as in nonpatient groups.

(4) The degree of freedom (via the group conscience) seemed to be more limited than that of the individuals composing the group. Socially unacceptable ideas that were not privately ego-alien still tended to be treated as unacceptable in the group. The group served to censor ideas and admitted those considered socially mature and thus more socially acceptable. The individual privately entertained as acceptable ideas that in a social setting were voiced as unacceptable, thus establishing and reinforcing mores and social controls.

(5) The leader subtly introduced his private ideas to the group. If they were rejected, he did not enforce them. (He did not want to press the point when he noticed the tenuous status of his ideas with regard to acceptance by the group.) Did the other members take on his ideas privately, while not publicly?

(6) Those persons whose egos were more capable of integration, while not of leadership caliber, did this more often (*i. e.*, they functioned more at a private level). Are these persons capable of becoming more of a leader in another group, after absorbing something of the leader that they did not have before? We believe they are, depending on the "social climate" of the new group and the new dynamics involved.

(7) The "going-alongers" were the least affected by the responses in any group. They also were the most disturbed clinically, both socially and psychologically (less participation in community affairs, et cetera). They manifested ambivalences of their roles and ideas as contrasted to the leaders and the followers, who presented active expressions of their roles. The members who went along with others only hesitatingly raised points, mainly agreed, and went along with the others.

(8) In general, group experiences seemed to reduce potentials for expression (reduce the number of private ideas that were expressed publicly), but what was individually retained was more reality oriented and thus more socially acceptable. (After group experience, ideas were less frightening to the individual. This is perhaps one of the most important processes involved in group psychotherapy.) Original ideas were not lost, but were condensed or diluted.

(9) The leader was one who was more able to accept his private ideas *plus* the ideas of the group and to integrate these into his own thinking.

(10) Leadership imparted to the follower and to other group members certain crucial and important information for integrative functions.

DISCUSSION

It is recognized that mere participation in any sort of experiment engenders a certain amount of apprehensiveness, as does participation in most social situations. We have attempted to minimize "test anxiety" by familiarity with the investigators and by working through the feelings of the group members who are being studied prior to the procedure being introduced.

In the group setting, the leader has to make a choice as to whether he will run the risk of revealing some of his private thoughts and endure the stress involved in facing the possibility of losing his position. If he choses to do so, this course of action is socially meaningful and presumably gives some measure of his stability where real or imagined stress is involved. Thus a man may be an acknowledged leader by military rank, social status, or as empirically defined by Bales' or Taguiri's procedure, but under the stress of revealing his inner thoughts he may break down. In a benign setting, decisions of this type are made under no great stress such as would be involved under threat of starvation, loss of one's life, or extreme pain; yet under these and other types of stress, leaders selected by the best available means do break down. The effect on morale to their associates

and to their countrymen, in the case of those to whom the Nation has entrusted its security, is far reaching.

We entered into this research with no preconceived ideas, and have made no attempt to test hypotheses. The research is still in progress and specific findings must await statistical verification. The next phase of our research emphasizes the determinants of ideas that are made public in a spontaneous, small, social group, making use of sound motion pictures to capture the social setting as much as possible.

Our intention in this article has been to present a methodology and an approach to observations on leadership. We hope eventually to arrive at a well-studied, central appraisal, involving the use of acceptable methods drawn from sociology, dynamic psychiatry, psychology, and other behavioral sciences combined in a total approach, rather than from any specific discipline.

REFERENCES

1. Parsons, T.: Illness and role of physician: sociological perspective. *Am. J. Orthopsychiat.* 21: 452-460, July 1951.
2. Caudill, W.; Redlich, F. C.; Gilmore, H. R.; and Brody, E. B.: Social structure and interaction processes on psychiatric ward. *Am. J. Orthopsychiat.* 22: 314-334, Apr. 1952.
3. Stanton, A. H., and Schwartz, M. S.: *The Mental Hospital.* Basic Books, Inc., New York, N. Y., 1954.
4. Fox, R.: *A Sociological Study of Stress: Physician and Patient on a Research Ward.* Unpublished Ph. D. thesis, Radcliff College, 1953.
5. Beck, S. J.: *Rorschach's Test.* Volumes I, II, and III. Grune & Stratton, Inc., New York, N. Y., 1944, 1945, 1952.
6. Bales, R. F.: *Interaction Process Analysis: A Method for the Study of Small Groups.* Addison-Wesley Press, Inc., Cambridge, Mass., 1950.
7. Tagiuri, R.: Relational analysis; an extension of sociometric method with emphasis upon social perception. *Sociometry* 15: 91-104, Feb.-May 1952.
8. Deutsch, F.: Associative anamnesis. *Psychoanal. Quart.* 8: 354-381, July 1939.

INCREASE IN DEATHS FROM CORONARY DISEASE

"Much of the rise in the recorded death rate from coronary artery disease during the past 15 years reflects merely the increasing proportion of older people in the population and changing fashions in certifying heart disease as a cause of death. The real increase has been relatively small, certainly not of the magnitude to justify the alarm expressed in the press and elsewhere."

—*Statistical Bulletin*
Metropolitan Life Insurance Co.
p. 1, Feb. 1957

CASE REPORTS

Ovarian Abscess Complicating Pregnancy

ROBERT C. KOEHN, *Captain, USAF (MC)*

OVARIAN ABSCESS complicating pregnancy is rare and few cases are reported in the literature. In the earliest case reported, by Aitken[1] in 1869, the patient developed a fatal peritonitis from rupture of an ovarian abscess during premature labor. In 1891 Coe[2] reported three cases of acute oophoritis complicating pregnancy: one patient improved under treatment; the second patient had an ovarian abscess rupture into the urinary bladder and later delivered a viable infant; the third patient had a septic episode in her seventh month of pregnancy, had an uneventful term delivery, and during her postpartum course had a surgical exploration because of an ovarian abscess. Brindeau[3] in 1917 reported a case of a fatal peritonitis that developed from rupture of an ovarian abscess immediately after a term delivery.

Pomini[4] described a case of a ruptured ovarian abscess which developed on the fifth day following a rapid, uneventful delivery; the outcome was fatal. An interesting and confusing case was reported by deLisi[5] of a left ovarian abscess associated with a right tubal pregnancy. Cummin[6] recorded a case of an ovarian abscess discovered in the fourth month of a patient's pregnancy. Exploratory laparotomy revealed free pus in the peritoneal cavity from a right ovarian abscess, and a right salpingo-oophorectomy was performed. The patient aborted a congenitally malformed infant twelve hours after surgery.

In a comprehensive discussion of ovarian abscess, Black[7] revealed that in 105 cases reviewed, the causative organism in 95 per cent of the cases was streptococcus. The other causative organisms were staphylococcus, colon bacillus, tuberculous, gonococcus, pneumococcus, et cetera. Ovarian infection occurred by the hematogenous route or by contiguity. It was Black's impression that primary involvement of the corpus luteum is not necessarily involved in all ovarian abscesses.

The following case is presented because of its rarity.

From Fitzsimons Army Hospital, Denver, Colo. Dr. Koehn is now assigned to 7505th U. S. Air Force Hospital, APO 232, New York, N. Y.

CASE REPORT

History. A 37-year-old white female, para iii, gravida iv, was admitted to this hospital on 30 July 1956, with a history of having had mild lower abdominal cramping and pelvic pain for approximately 9½ hours. Her last menstrual period was on 11 February 1956. The patient had been followed in the Prenatal Clinic at Fitzsimons Army Hospital since 14 May 1956. Examination at her initial prenatal visit revealed a uterus enlarged to the size of a 3-months pregnancy and a cyst, 2 cm by 2 cm in size, of a Skene's gland. At that time the history obtained indicated she had had a pelvic inflammatory disease several years prior to her present pregnancy. On admission to the hospital, there was no history of bleeding or rupture of the membranes; on closer questioning of the patient, it was found that she had had a similar episode of pain in the lower abdomen, especially in the right lower quadrant, in May 1956 and again in June 1956. At the June visit, a pelvic examination was not performed. For 2 weeks prior to admission the patient had noted some irregularity of her heart; however, she had not experienced other cardiovascular symptoms.

Physical Examination. Physical examination on admission revealed the following positive findings: Blood pressure, 115/60 mm Hg; pulse rate, irregular; fine, moist rales heard posteriorly over both lower lung fields on auscultation of the chest; the fundus of the uterus was at the level of the umbilicus; there was marked tenderness in the right lower quadrant of the abdomen extending into the right flank area and mild generalized tenderness over the entire abdomen; marked right costovertebral angle tenderness. Pelvic examination was deferred because the examiner thought that the patient might be in immature labor.

Laboratory Studies. Hemoglobin was 12 grams per 100 ml; hematocrit, 36 ml per 100 ml; urinalysis, 6 to 8 white cells per high-powered field with multiple clumping of the cells in the urine. Numerous bacteria were seen in the catheterized specimen of urine.

Course in Hospital. On 31 July 1956, the patient complained of anorexia and mild nausea and vomiting on several occasions. Examination of the abdomen revealed mild distention and a decrease in the quality of bowel sounds. It was considered that the patient had an acute pyelitis and a paralytic ileus. On the same date a chest roentgenogram was obtained which was interpreted as within normal limits. A cardiac consultation was obtained, and the cardiac service believed that no heart disease was present. The electrocardiogram was interpreted as showing frequent premature ventricular contractions. A flat plate of the abdomen obtained on the same day revealed a mild ileus, and a soft tissue shadow was observed in the lower abdomen displacing the uterus upward, probably representing an extrauterine mass in the pelvic region.

The patient was treated conservatively for paralytic ileus and she responded very well. On 3 August 1956, a pelvic examination revealed a large mass posterior and inferior to the uterus; the size was estimated to be approximately 12 cm in its greatest diameter. The mass was moderately tender. Up to this time the patient had been relatively afebrile. The patient had been on penicillin and streptomycin sulfate since 31 July, when the diagnosis of pyelitis had been made.

On 6 August 1956, the patient was taken to surgery where, under general anesthesia, exploratory laparotomy was performed. At the time of exploration it was found that the large mass was on the right posterolateral surface of the uterus and was a large ovarian abscess. The fallopian tube on that side was moderately hyperemic; however, it was not adherent to the surface of the abscess. The ovarian abscess was adherent to the right posterolateral surface of the uterus, to the posterior wall of the right broad ligament, and to the right lateral pelvic wall. Blunt dissection was employed in an attempt to remove the abscess, and during this procedure the abscess was inadvertently ruptured. The entire right ovary with the abscess was removed. Culture of the contents of the abscess revealed alpha hemolytic streptococcus. The abdomen was closed in layers. The patient tolerated the procedure well with minimal blood loss.

Both preoperatively and postoperatively, the patient was given procaine penicillin G (600,000 units) twice daily, and also 0.5 gram of streptomycin sulfate twice daily. Postoperatively, the patient did very well and had a relatively afebrile course.

It might be noted here that the patient was placed on 50 mg of progesterone daily beginning the day before surgery and continued on it to 10 August 1956. On the 5th and 6th postoperative days, the skin clips were removed. Pelvic examination prior to patient's discharge from the hospital, on the 8th postoperative day, revealed some thickening of the adnexal area, more on the right side, but it was nontender.

Postoperative. The patient was placed in the obstetrics clinic and followed there for the remainder of her prenatal care.

The patient was admitted to the obstetrical labor room on 18 November 1956 in active labor. Labor progressed satisfactorily under analgesia induced by Demerol Hydrochloride (brand of meperidine hydrochloride), scopolamine, and Thorazine Hydrochloride (brand of chlorpromazine hydrochloride). After five hours and five minutes, the patient was delivered spontaneously, under pudendal block anesthesia, of a viable male infant. There were no complications in the third stage. The postpartum course in the hospital was uneventful.

Pathologic Findings. The ovarian abscess (fig. 1) was an irregular cystic mass weighing 150 grams. The external surface was smooth and glistening with marked congestion. The free surface was gray in color; the attached surface was deep red. The contents consisted of a homogenous purulent material having a greenish cast with no

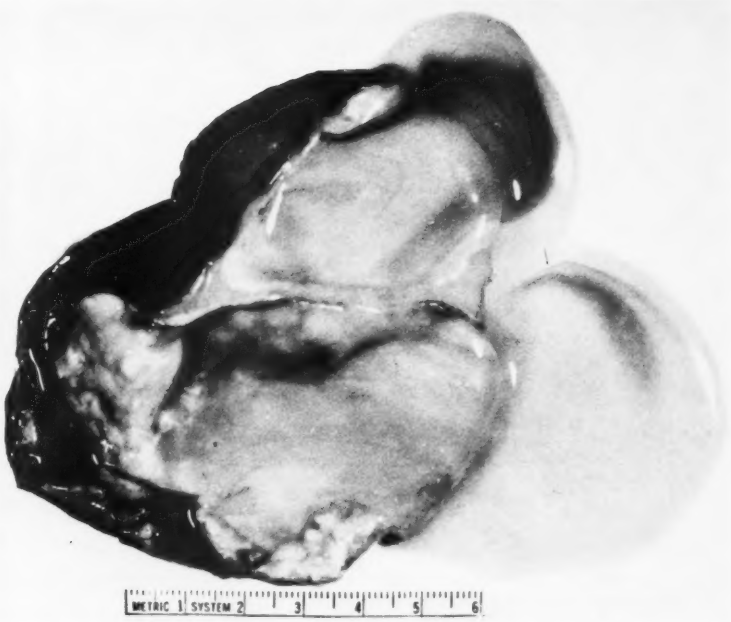


Figure 1. Gross specimen of ovarian abscess showing glistening, congested surface. Darkened area represents area attached to the surrounding structures.

odor. The walls of the abscess averaged 3.0 to 4.0 mm in thickness. Microscopically, (figs. 2, 3) the walls were very edematous and heavily infiltrated by acute inflammatory cells. There was localized proliferation of the external mesothelial cells. An acute fibrinous exudate covered the external surface. Inflammatory exudate lined the abscess cavity.

SUMMARY AND CONCLUSIONS

A case is presented of a patient's ovarian abscess complicating pregnancy. Reports of such cases in the literature are rare. The patient was admitted to Fitzsimons Army Hospital on 30 July 1956, with a history of having experienced mild lower abdominal cramping and pelvic pain for approximately 9½ hours. She had been followed in the prenatal clinic at this hospital since 14 May 1956. On 3 August 1956, a pelvic examination revealed a large mass posterior and inferior to the uterus. The afebrile course of the patient added to the confusion in considering the preoperative differential diagnosis of a pelvic mass complicating pregnancy.

Due to the size and to the unknown nature of the tumor, surgical intervention was deemed necessary. The duration of ges-

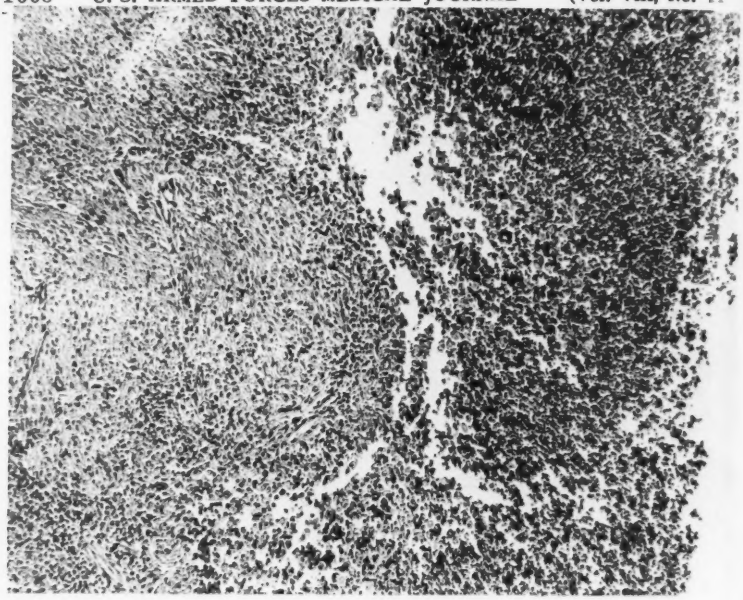


Figure 2. Microscopic view of a section of the wall of the ovarian abscess. (× 75)

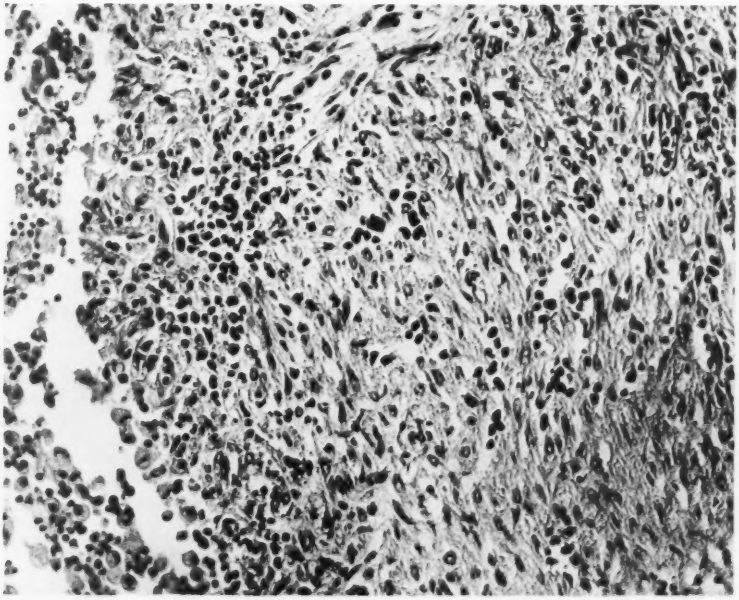


Figure 3. Higher-power view of a section of the wall of the ovarian abscess. (× 275)

tation was ideal for considering an operative procedure. With the use of penicillin and streptomycin sulfate during the preoperative and postoperative periods, a severe peritonitis was avoided even though accidental spillage of the contents of the abscess occurred at surgery. Whether parenteral progesterone was of value in the continuation of the pregnancy is debatable.

It was considered that the streptococcus organism was carried to the ovary by the hematogenous route; but the actual date of the primary involvement of the ovary is not certain, and may have been in May 1956 when she had experienced pain in the right lower quadrant of the abdomen. By removing the abscess the future danger of its rupture was avoided. Rupture of the abscess could have occurred at any time during pregnancy, during labor, or during the postpartum course; and could have been fatal.

REFERENCES

1. Aitken, L.: Remarks on pelvic peritonitis and pelvic cellulitis, with illustrative cases. In *Transactions of the Edinburgh Obst. Soc.* 2: 77-107, Mar. 1870.
2. Coe, H. C.: Acute oöphoritis complicating pregnancy. *Am. Gynec. J.* 1: 670-678, Dec. 1891.
3. Brindeau, A.: Salpingo-ovarites compliquant la grossesse. Vol. 9: 1-33, Jan.-Mar. 1917. *Arch. mens. d' obst. et de gynéc.* 9: 1-33, Jan.-Mar. 1917.
4. Pomini, F.: Rottura di ascesso ovarico intrapartum; peritonite acuta. *Atti. Soc. ital. di ostet. e ginec.* 35: 202-205, Mar.-Apr. 1939.
5. deLisi, D. G.: Gravidanza tubarica destra associata ad ascesso ovarico sinistro. *Atti. Soc. ital. di ostet. e ginec.* 36: 226-231, Mar.-Apr. 1940.
6. Cummin, R. C.: Ovarian abscess during pregnancy. *J. Obst. & Gynaec. Brit. Emp.* 58: 1025-1027, Dec. 1951.
7. Black, W. T.: Abscess of ovary. *Am. J. Obst. & Gynec.* 31: 487-494, Mar. 1936.

WHO FIGHTS DISEASE GLOBALLY

The yearly investment by the United States in WHO of about one cent per $1,000 of national income, or less than the cost of a three-cent postage stamp per capita, is small indeed when measured against the huge returns of increased productive labor, higher standards of living, and world amity. WHO, in its global fight against disease, is doing its share to bring this about in an unobtrusive but highly practical way. Such constructive programs of technical assistance and training designed to win the trust of the peoples of the free world can effectively supplement the armed might of military machines as guarantees of world peace.

—S. Z. LEVINE, M. D.
in *New England Journal of Medicine*
p. 816, Nov. 11, 1954

444645 O - 57 - 8

Bilateral Bell's Palsy Complicating Infectious Mononucleosis

HALL G. CANTER, *Captain, MC, USA*
WILLIAM R. SCHILLHAMMER, *Major, MC, USA*

NOT INFREQUENTLY neurologic complications occur during the course of infections mononucleosis. The following case of bilateral Bell's palsy complicating this disease is believed worthy of reporting as another illustration of this growing group of phenomena.

CASE REPORT

A 24-year-old white man was admitted to this hospital on 27 August 1956 because of progressive fatigue of two weeks' duration. The family history revealed that when the patient was an infant his father had committed suicide. For many years he had had recurrent, mild, frontal headaches.

Two weeks prior to admission the patient noted the onset of progressive fatigue. Eight days before entry to the hospital he had chills and was feverish. The day before admission he was unable to carry out his duties of clerk-typist, because of fatigue. On 27 August he noticed some swelling of the glands in the anterior part of his neck, reported to the hospital, and was admitted.

Physical examination revealed a well-developed and well-nourished white man who was in no acute distress. His temperature was 99.6°F; pulse rate, 88 per minute; and blood pressure, 116/70 mm Hg. His tonsils were moderately enlarged and there was a small amount of exudate. Slightly enlarged, tender lymph nodes could be felt in the anterior and posterior cervical, axillary, and inguinal areas, and the epitrochlear nodes also were enlarged. The spleen and liver were not palpated. The remainder of the physical examination was within normal limits.

Urinalysis and a serologic test for syphilis were negative. A roentgenogram of the chest was normal. The initial white blood cell count was 12,550 per μl with a differential of 27 per cent neutrophils, 66 per cent lymphocytes, 27 per cent of which were atypical, 6 per cent monocytes, and 1 per cent eosinophils. The initial heterophil agglutination titer was 1: 448. As noted in table 1, blood cell counts during the pa-

From U. S. Army Hospital, Fort Hood, Tex.

TABLE 1. *Hematologic and serologic findings in patient with bilateral Bell's palsy, complicating infectious mononucleosis*

Date	Total white blood cells (per μl)	Differential count (per cent)					Hemoglobin (grams per 100 ml)	Heterophil agglutination titer		
		Neutrophils	Lymphocytes	Atypical lymphocytes	Monocytes	Eosinophils		Without absorption	After guinea pig kidney absorption	After beef cell absorption
8-28-56	12,550	27	66	27	6	1	11.5			
8-28-56	12,500	42	54	15	3	1	12.0	1:448	1:224	neg.
9-4-56	12,650	41	59	26	0	0	12.0	1:224	1:28	neg.
9-7-56	5,250	55	40	6	3	2	16.0	1:112		
10-3-56	4,850	46	50	0	2	2	13.5	neg.		
11-15-56	7,850	45	48	0	4	3	15.0	neg.		

tient's hospitalization gradually returned toward normal. The heterophil agglutination remained positive although the titer decreased. The hemoglobin was 11.5 grams per 100 ml on admission and gradually rose to 16.0 grams. Liver function tests revealed an icteric index of 12.8, and the cephalin-cholesteral flocculation test was 3 plus in 48 hours.

The patient was placed at bed rest and given 0.6 gram of acetylsalicylic acid every four hours as needed for headaches. On the day of admission he complained of frontal headache and during the next two to three days mentioned numerous symptoms, including tightness of the facial skin and paresthesias of the legs and hands. He also expressed concern over the possibility that he might have a brain tumor or other serious or perhaps fatal disease.

The ear, nose, and throat consultant found no evidence of sinusitis. On 29 August a psychiatric consultant expressed the opinion that the patient had hypochondriasis, and reassurance was given. Neurologic examination at this time was normal. On 30 August the patient developed bilateral seventh nerve palsy (figs. 1 and 2). The neurologic consultant considered at this time that the Bell's palsy was due to intracanalicular inflammatory process secondary to infectious mononucleosis. He believed that the prognosis for recovery was excellent.

The patient continued to express hypochondriac complaints with numerous somatic symptoms and attempted to direct his own therapy. On 1 and 2 September he was given 60 units of corticotropin and on 3 and 4 September, 40 units. There was no change in his clinical course with this therapy. He was given 50 mg of thiamine hydrochloride twice daily, and 30 μg of vitamin B_{12} daily, both subcutaneously. There was little change until 18 September, when slight motion of the perioral muscles on the right was seen.

The patient was discharged to duty on 28 September and was followed as an outpatient. He was readmitted to the hospital on 2 October complaining of fatigue. No further abnormalities were noted and he was discharged on 6 October. A heterophil antibody test at this time revealed no titer. Over the next three or four months there was nearly complete return of function of the facial muscles. He was seen on innumerable occasions for many complaints, none of which were associated with objective findings.

DISCUSSION

Bilateral Bell's palsy from any cause is a relatively rare phenomenon, and as a complication of infectious mononucleosis is extremely rare. From a review of the literature we are able to find only two documented cases of bilateral Bell's palsy complicating this disease.[1,2]

In a recent extensive review of the complications of infectious mononucleosis by Smith[3] and a review by Bernstein and Wolff,[4]

Figure 1. The patient attempting to close his eyes.

emphasis was placed on the neurologic complications of the disease. The conclusion of these reviews is that the symptomatology and clinical findings of these neurologic complications are dictated by the site of maximal involvement, whether in the central or the peripheral nervous system. Bernstein and Wolff further stated that neurologic complications may be expected in less than 1 per cent of all cases of infectious mononucleosis. Landes, Reich, and Perlow[5] stated that the patient may first be seen with only neurologic abnormalities and the early diagnosis of infectious mononucleosis overlooked unless a heterophil agglutination is accomplished.

The case presented is illustrative of Bell's palsy complicating the course of infectious mononucleosis. We believe that nodes within the facial canal became involved in the inflammatory process of infectious mononucleosis and, because of the

Figure 2. The patient attempting to show his teeth and raise his eyebrows.

resultant pressure in a closed space, caused bilateral seventh nerve paralysis. It is interesting that both seventh nerves were affected simultaneously. The patient was given a short course of corticotropin, and thiamine hydrochloride and vitamin B_{12} parenterally without apparent change in his clinical course. Recovery has been essentially complete.

SUMMARY

A case of bilateral Bell's palsy complicating the course of infectious mononucleosis in a young white male is recorded. Recovery in this case was uncomplicated. The course of the disease was apparently unaffected by steroid and vitamin therapy.

REFERENCES

1. Creaturo, N. E.: Infectious mononucleosis with polyneuritis (Guillain-Barré syndrome); report of case with facial diplegia treated with 2, 3 dimercaptopropanol

(BAL). *J. A. M. A.* 143: 234-236, May 20, 1950.

2. Gsell, O.: Meningitis serosa bei Pfeifferschem Drüsenfieber (Mononucleosis infectiosa). *Deutsche med. Wchnschr.* 63: 1759-1762, Nov. 19, 1937. Cited in reference 4.

3. Smith, J. N., Jr.: Complications of infectious mononucleosis. *Ann. Int. Med.* 44: 861-873, May 1956.

4. Bernstein, T. C., and Wolff, H. G.: Involvement of nervous system in infectious mononucleosis. *Ann. Int. Med.* 33: 1120-1138, Nov. 1950.

5. Landes, R.; Reich, J. P.; and Perlow, S.: Central nervous system manifestations of infectious mononucleosis; report of case. *J. A. M. A.* 116: 2482-2484, May 31, 1941.

CARE IN TERMINAL ILLNESS

Prolongation of life, merely for the sake of a brief postponement of death, does not appeal to me. Sometimes it is difficult to know when further treatment becomes useless. On the other hand, there are many times when we do know and can predict the outcome if either of two alternative courses is selected. Typical of this situation is ureteral obstruction in terminal carcinoma of the cervix. Uremia is a common cause of death with cervical carcinoma. Moreover, it represents a gradual fading and dimming of consciousness, and to me would seem to be an easy and painless way to die. Nevertheless, there are those who would perform cutaneous ureterostomy or pyelostomy on such patients. This might prolong life by six months and certainly would restore the patient to consciousness and awareness of her surroundings. But, what does she pay for these six months? At least the terminal two or three weeks will be associated with great pain and any or all of the disagreeable symptoms of late cervical cancer. I would not wish this for a loved one if the alternative were a relatively easy and painless death hastened perhaps a few months.

On the facade of the Union Station in Washington, D. C. is carved in granite, the admonition, "Speed the parting guest." I do not quote this as a plea for euthanasia. It is a plea to the physician to refrain from unnecessary heroics. When confronted with a rational and sentient patient, about to embark upon the final phase of his terminal illness, the physician should ask himself the question, "If I were the patient, what would I want done to me?"

—WILLIAM F. MENGERT, M. D.
in *Illinois Medical Journal*
p. 100-101, 102, Sept. 1957

Ganglioneuroma

RICHARD C. SCHULTZ, *Captain, MC, USA*
PHILIP J. NOEL, Jr., *Colonel, MC, USA*

GANGLIONEUROMA was first described by Loretz[1] in 1870 in a thoracic sympathetic chain; however, according to Ewing[2] the entity was prophesied by Virchow about 1865. The tumor is defined as a rare, benign tumor composed of differentiated sympathetic ganglion cells mixed with great numbers of nerve fibers sheathed by Schwann cells. Although the tumor is considered benign, a ganglioneuroma with metastasis to lymph nodes was described by Miller[3] in 1908 and corroborated by Beneke[4] and Berner.[5] Neuroblastoma is the malignant counterpart of the tumor. The tumor is most common in young adults, with a slight preponderance in women.[6] Generally, the common sites of origin are one third in the adrenal medulla, one third in the abdominal and pelvic sympathetic chains, and one third from the cervical sympathetic chains and scattered in other sympathetic chains.[2] Willis[7] believed that the ganglioneuroma originates in the fetal or early postnatal period as a neuroblastoma and then matures into a ganglioneuroma. He also believed that there is always a malignant potential to this tumor.

CASE REPORT

A 20-year-old white soldier presented himself at a dispensary with complaints of constipation and weight loss since induction into the Army 4 months previously. The amount of weight loss had been approximately 12 to 15 pounds. He had been conscious of a mass in the right lower abdominal quadrant which had not been tender or painful for several weeks prior to seeking medical attention. He denied the passage of any blood in his bowel movements or tarry stools. There had been no change in the size of his stools or in his bowel habits. He had not experienced anorexia, malaise, chills, fever, or night sweats. Upon questioning, the patient admitted that he had been aware of bilateral swelling in the supraclavicular fossae for 6 or 7 years. He denied any local or radiating pain into his arms. There was no dysfunction of the upper extremities, nor were there symptoms referable to the head or neck. He denied paresthesia and muscular weakness of his extremities.

From U. S. Army Hospital, Fort Carson, Colo.

Past History. The past history was essentially negative. The patient was a student, prior to being inducted into the service from Kansas City, Mo., on 28 February 1956. His first duty assignment was at Fort Carson, Colo., where he arrived on 8 March 1956. His mother, father, and sister are living and well. Family history of cancer was negative. The patient had the usual childhood illnesses and knows of no serious illnesses in adult life. There had been no operations and no injuries that he could recall.

The system review was entirely negative except for the musculoskeletal system. Here, the patient admitted to having had a mild, low back pain for approximately three years without apparent cause. His pain was without radiation and seemed to be unrelated to activity. He denies any muscular weakness.

Physical Examination. This tall, slender, young adult white man was in no acute or chronic distress and appeared well oriented and alert. His admission weight was 154 pounds; height, 6 feet 1 inch; temperature, 98.6°F; pulse rate, 80/min; and blood pressure, 110/70 mm Hg. There were firm swellings in both supraclavicular fossae which had the appearance of being hypertrophied trapezius muscles. There was no tenderness in the area. There was a full range of cervical spine motion. The eyes were normal. The fields of vision were normal, and funduscopic examination was negative. Ears, nose, throat, and mouth were negative. The chest was normal. Lungs were clear to percussion and auscultation. Heart borders were within normal limits. There was a regular sinus rhythm and no murmurs were heard. There was a slightly tender, round, partially movable mass of approximately 4 cm by 4 cm in the right lower quadrant in the cecal area. There were no palpable hernias. The genitalia were normal adult male with testes descended bilaterally and digital examination of the rectum revealed normal sphincter tone. There was no mass within the rectum, but the examining finger could palpate a firm, nodular mass that seemed outside the rectum, but was pressing firmly against it. No hemorrhoids were visible. The prostate was normal to palpation and there was no tenderness. Examination of the back revealed normal stance, and a full range of motion was performed without pain. There was no tenderness to palpation of the spinous processes, and the long muscles were not in spasm. Examination of the extremities revealed a full range of motion with normal muscular strength. Neurologic examination was essentially negative, reflexes were grossly normal and no pathological reflexes were elicited. There were no palpable lymph nodes. Initial clinical impressions were that there might be either a carcinoma of the cecum or an appendiceal abscess.

Laboratory Studies. Hemoglobin was 16.4 grams per 100 ml; leukocyte count was 8,500/μl, with 56 per cent segmented neutrophils, 36 per cent lymphocytes, 4 per cent band forms, and 4 per cent eosinophils. The admission urinalysis was negative. Qualitative cardiolipin microflocculation test was negative.

On admission, chest and upper gastrointestinal roentgenograms were within normal limits. The small bowel studies showed elevation of the ileum in the right lower quadrant by an extrinsic mass (fig. 1). Barium enema demonstrated slight elevation of the cecum and displacement of the rectum to the left by a rounded, extrinsic mass (fig. 2). Excretory urography showed lateral and anterior displacement of the right ureter just above the brim of the bony pelvis. Distal to this the right ureter was not visualized. The right side of the bladder did not fill because of extrinsic pressure from the right and posteriorly (fig. 1). The impression was gained from this study that there was a right-sided mass arising from deep within the pelvis and extrinsic to the gastrointestinal and genitourinary tracts. The displacement of the bladder precluded retrograde urography. There was no roentgenographic evidence of bony involvement of the pelvis or sacrum. There was no calcification in the mass. Retroperitoneal sarcoma or sarcoma arising from the prostate were then considered in the differential diagnosis.

Roentgenograms of the cervical and supraclavicular soft tissue revealed bilateral soft tissue masses in the base of the neck. No cal-

Figure 1. Small bowel study showing superior displacement of the intestines. By excretory urography, the bladder is demonstrated as filling on the left side only.

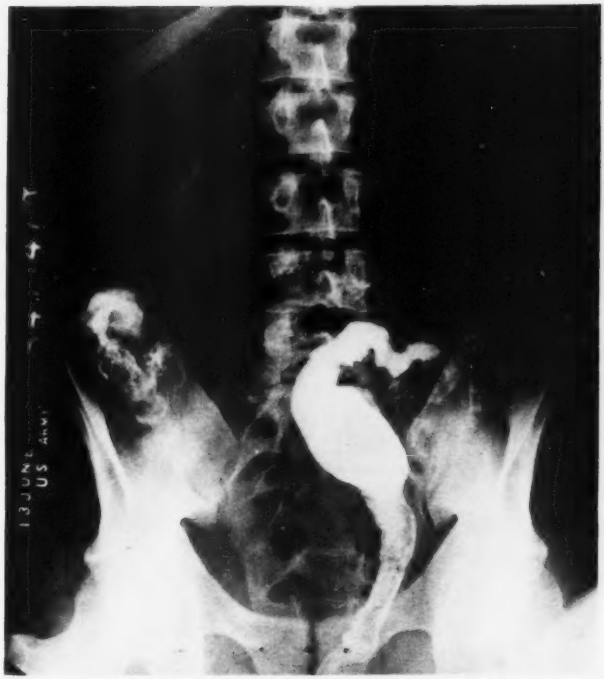


Figure 2. Barium enema showing the displacement of the rectum to the left by an extrinsic mass.

cifications were seen in these masses. The cervical spine films revealed gross enlargement of all neural foramina bilaterally, more marked on the left (fig. 3). It was noted that these neural foramina were rimmed by a thin line of sclerosis, which would indicate that the dilatation had been a long, slowly developing process. The vertebral bodies appeared to be intact otherwise. The bony bridges between the neural foramina were markedly thin, especially on the left side. A slight increase in the cervical curvature was noted in the lateral view. Survey films of the thoracic and lumbosacral spine revealed a slight enlargement of the neural foramina to T2 and T5. Repeat chest films during the hospital course were consistently negative.

Course in Hospital. At the time of admission a proctoscopy was performed which was essentially negative except for a pronounced displacement of the rectum to the left by an extraneous mass. On the ninth hospital day a laparotomy was performed, and a large retroperitoneal mass presented itself in the lower right portion of the pelvis. The liver was grossly normal, as were the spleen and stomach. The entire small and large bowel were examined and appeared to be normal. There were palpable shot-like nodes in the root of the mesentery of

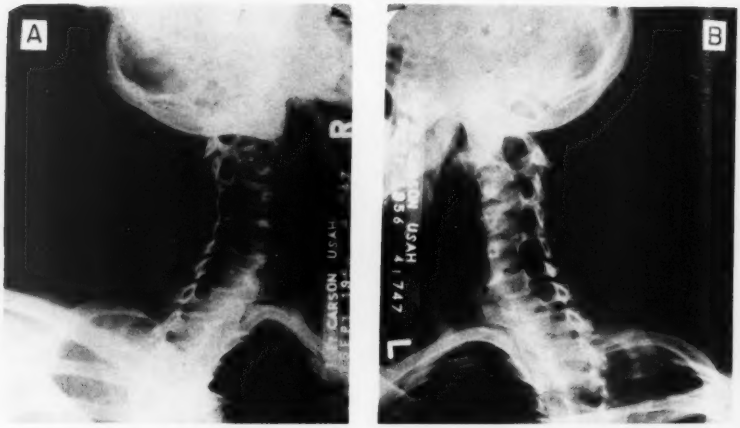


Figure 3 (A and B). Oblique views of the cervical foramina showing marked enlargement bilaterally.

the small bowel along the aorta. While the mass appeared to be adherent to the urinary bladder, it did not extend into it and separated relatively easily. A frozen section was made from the mass and, although the pathologist could not identify the tumor, he thought it might be a myxoma. He stated that it did not appear malignant, but that he could not describe it positively as benign. He stated that it did not appear to be an epithelial tumor or a lymphoma.

A separate similar mass was located near the bifurcation of the aorta, and the mass seemed to encircle the proximal portion of the rectum.

It was decided clinically that the tumor was of a benign nature, and was spreading by local enlargement rather than infiltration, and that as much of the tumor mass as possible should be resected. The greater portion of the tumor which presented in the pelvis on the right side was dissected from the urinary bladder and removed in one piece (fig. 4). Other discrete tumor nodules were dissected from the pelvic wall at the bifurcation of the aorta, the hollow of the sacrum where they pressed on the rectum, and from the base of the urinary bladder (fig. 5). It was impossible to remove all the tumor tissue without mutilation of functioning structures. An abdominal perineal procedure was considered, but was dismissed, due to the probable benign nature of the lesion. Penrose drains were placed retroperitoneally and also between the rectum and coccyx and extending up into the hollow of the sacrum. Stay sutures were used in closure of the abdominal wall.

The final histologic diagnosis from regular prepared slides was that of a well-differentiated ganglioneuroma without neuroblastomatous elements (figs. 6 and 7).

Figure 4. View of the partially encapsulated, lobular mass from pelvic region; note multiple surface projections. Tumor has been cut to show appearance inside of capsule.

Postoperatively, the patient recovered well, and there was very little drainage. The patient, however, had no anal sphincter control, and the urinary bladder remained on Foley catheter drainage as he was unable to void. All sutures were removed on the twelfth postoperative day. Periodically throughout the postoperative course, the bladder was filled with sterile saline to the point of discomfort, but the patient remained unable to void. On the thirty-seventh postoperative day the patient voided spontaneously, but incompletely. A urinary residual

Figure 5. These specimens represent some of the rather discrete nodular, partly encapsulated tumor masses dissected from around the bifurcation of the aorta, rectum, and base of urinary bladder.

and cystitis were treated with antibiotics and Urecholine Chloride (brand of bethanechol chloride) and finally with continuous catheter drainage.

After satisfactory recovery from the laparotomy, including recovery of anal sphincter tone and ability to have controlled bowel movements, attention was turned to investigation of the supraclavicular masses. Previously taken roentgenograms revealed soft tissue densities in both supraclavicular areas and oblique views of the cervical vertebrae revealed markedly enlarged neural foramina bilaterally (fig. 3), with notable increase in cervical lordosis. On the fifty-fourth postoperative day a biopsy specimen was taken under local anesthesia from an enlarged nerve trunk of the right brachial plexus. At the time of biopsy, the patient experienced a numb sensation in the right thumb. The pathologic diagnosis from this biopsy was reported as normal nerve tissue of the brachial plexus and normal supraclavicular fat pad on the right. The site of biopsy healed without complications.

Follow-up cystometrograms revealed weak detrusor power of the urinary bladder, the primary dysfunction being in the voiding pressure, probably due to partial bladder denervation. Continuous catheter drainage was maintained. While on antibiotic therapy for urinary residual and cystitis, the patient developed a bilateral axillary hidradenitis which did not respond to changes of antibiotics or soaks. Repeated cultures of these pustules produced no growth. Prior to the meeting of the Medical Board for medical discharge from the Army, the patient

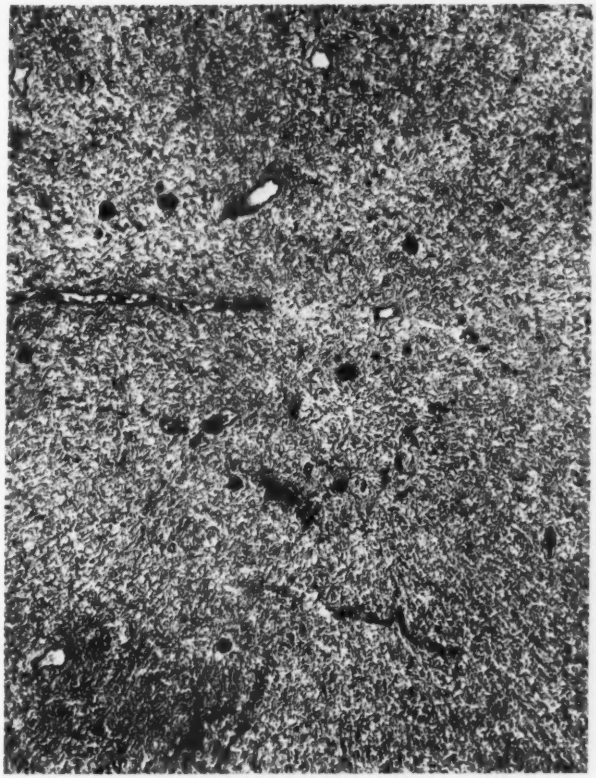


Figure 6. Representative area show adult sympathetic ganglion cells in a neurofibromatous stroma. (× 80)

had regained a considerable amount of weight and was asymptomatic except for his lack of ability to empty completely his urinary bladder. The bilateral hidradenitis subsided to some degree. The gastrointestinal system was functioning adequately, and all wounds were healed.

The patient was transferred to a named Army General Hospital from which he was discharged to inpatient care at a Veterans' Hospital near his home.

COMMENTS

In January 1956, Scoville, Polcyn, and Dunsmore[6] described intraspinal ganglioneuroma as extremely rare, dumbbell in shape, with connections extending through the intravertebral foramina. In differentiating between the paraspinal and intraspinal origins of ganglioneuroma, they pointed out that when the origin is paraspinal, the invasion into the spine is generally through only one

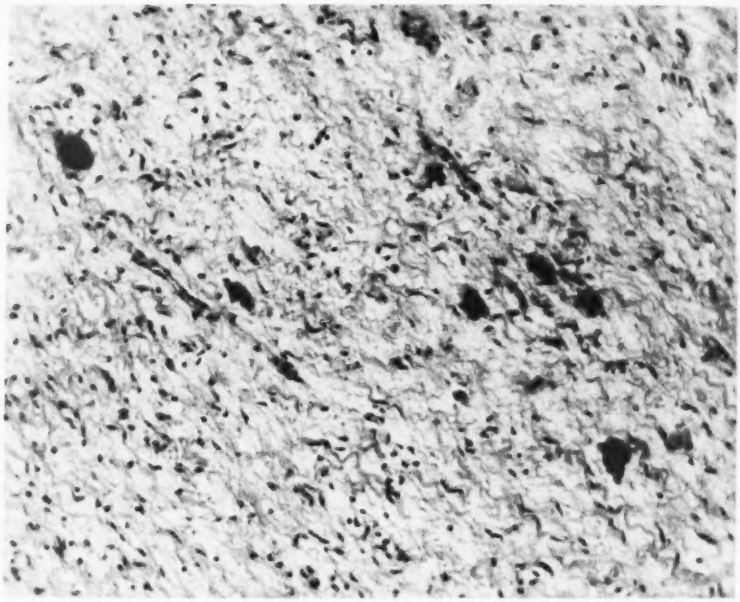


Figure 7. Photomicrograph of characteristic area composed of many Schwann cells and several fully differentiated ganglion cells sheathed by satellites. (× 150) (Courtesy of Armed Forces Institute of Pathology)

or two foramina; if intraspinal in origin, extension outward is usually through multiple foramina. There were no specific symptoms in the differentiation of these two origins. Rowlands and Baird[9] pointed out that mediastinal ganglioneuroma may have a cervical extension presenting as a swelling above the clavicle or sternum.

In our case, it was decided that the tumor probably had two separate origins: origin from the pelvic sympathetic plexus, and based on roentgenographic evidence alone, a cervical intraspinal origin.

CONCLUSION

A case of ganglioneuroma with two probable sites of origin in a young recruit has been presented. The surgical treatment and disposition of this patient have been outlined, and several points of interest from the medical literature related to this particular case have been given. It should be pointed out that roentgen-ray therapy plays no part in the treatment of this tumor.

ACKNOWLEDGMENT: The authors are grateful to Lt. Col. Prince D. Beach, MC, USA; Maj. Robert F. Dillon, MC, USA; and Capt. Henry T. Uhrig, MC, USA, for their assistance in preparing this case for presentation.

REFERENCES

1. Loretz, W.: Ein Fall von gangliösem neurom (ganglion). *Virchows Arch. f. path. Anat.* 49: 435-437, 1870.

2. Ewing, J.: *Neoplastic Diseases; treatise on tumors.* 4th edition. W. B. Saunders Co., Philadelphia, Pa., 1941. pp. 479-483.

3. Miller, J. W.: Ein Fall von metastasierendem Ganglioneurom. *Virchows Arch. f. path. Anat.* 191: 411-421, 1908.

4. Beneke, R.: Zwei Fälle von Ganglioneurom. *Beitr. path. Anat.* 30: 1-48, 1901.

5. Berner, J. H.: Ein Fall von malignem Ganglioneurom. *Beitr. path. Anat.* 203-208, 1922.

6. Anderson, W. A. D. (editor): *Pathology.* C. V. Mosby Co., St. Louis, Mo., 1948. pp. 1102, 1384.

7. Willis, R. A.: *Pathology of Tumours.* C. V. Mosby Co., St. Louis, Mo., 1948. pp. 843-871.

8. Scoville, W. B.; Polcyn, J. L.; and Dunsmore, R. H.: Spinal ganglioneuroma; end results and differential diagnosis. *J. Neuropath. & Exper. Neurol.* 15: 85-92, Jan. 1956.

9. Rowlands, B. C., and Baird, I. M.: Ganglioneuroma of lumbar sympathetic chain; report of case. *A. M. A. Arch. Surg.* 69: 607-611, Nov. 1954.

BEER BELLY

"Spontaneous rupture of the oesophagus, unconnected with trouble in the central nervous system, can occur when vomiting follows draughts of beer on a Saturday night. Incoordination in the normal mechanisms of vomiting may be due to reflex failure caused by disease of the central nervous system, relayed to the autonomic system, or to its befuddlement by alcohol so that the vomit cannot escape rapidly through the gullet. Certainly the lesion from both causes is the same —a linear tear in the lower third of the oesophagus nearly always on the left side. Perhaps the cricopharyngeus is a split second late in relaxing above the uprising, thus forming another kind of glottal stop."

—ANNOTATIONS
in *Lancet*
p. 29, 7 July 1956

444645 O - 57 - 9

Relation of Military Assignment to Choice of Conversion Symptoms

JEAN LYLE, *Captain, MSC, USAR*
JOSEPH BERCHMANS RIOUX, *Captain, MC, AUS*

CONVERSION hysteria is an intriguing nosologic entity in which there is transfer of an unconscious conflict from the psyche into the soma. This process of materialization not only diminishes the intensity of the conflict but at times makes it evident, as if it could be touched while in the body. Those who are predisposed appear to be more than normally impressed by physical disease in themselves and in others. In facing adversity, they would modify their own bodies instead of external reality, by presenting striking imitations of organic illnesses.

This article deals exclusively with one aspect of the phenomenon, namely, the choice of physical symptoms, and attempts to answer one question: Why, of all the organs available in the organism, is one chosen in preference to another for the reception and expression of an unconscious conflict? A typical case history as exemplified in a given military assignment is reported as an illustration.

In the literature, explanations for the choice of physical symptoms in conversion have been given the generic term of somatic compliance. As far as can be estimated, the body complies somatically to the reception of a conflict in one of the following ways. First, by reason of congenital defect, accident, or disease a part of the body may become an easy receptor of conflicts. According to Ferenczi,[1] the function impaired by conversion hysteria is likely to be the one least important to the patient. Second, the opposite can be true. A part of human anatomy may fall prey to conversion when its maximum physiologic activity coincides with the emergence of an unconscious conflict. Thus, foot soldiers who have to make the greatest use of their legs may, under stress of combat, become paralyzed and unable to walk. Janet[2] believed that the function impaired by conversion hysteria is the most important one to the person. Finally, psychoanalysts emphasize the symbolism of certain organic functions which favors the acceptance of unconscious conflicts. It is known that

From U. S. Army Hospital, Fort Jay, N. Y.

the mouth more adequately expresses dependency needs, while activity of the bowels better conveys the idea of hostility. "Convex" organs, according to Fenichel,[3] symbolically represent the male organ and male aspirations. As a consequence it could be said that, in the male, paralysis of the hand signifies the degradation of his manhood.

Ferenczi's theory is in closer connection with the case we report. Noting the prevalence of left-sided hysterical paralysis among right-handed people, Ferenczi concluded it was due to the fact that the left side was already partially disengaged from the patients' conscious activities and consequently "more accessible to unconscious impulses."[1] According to other authors, the left side would be preferred by the process of conversion because it symbolically means *wrong* when the right means *correct*.[3]

Without contesting the validity of the above views, an additional explanation is offered for the choice of physical symptoms in conversion hysteria. It is tentatively formulated as follows. All other conditions satisfied, a bodily function could become hampered by the process of conversion because of its very importance to the fulfillment of a given duty, while being at the same time the least important to the performance of an individual as an individual. For instance, it has been observed that combat sergeants and lieutenants who have to issue verbal commands develop hysterical aphonia in preference to other forms of hysteria. With infantrymen, the preference is for paralysis of legs; or for lower back syndrome, otherwise known as camptocormia.[4,5] Airplane pilots for whom vision is essential more readily become the victims of hysterical blindness. Among civilians, occupational neuroses, like writer's cramp and miner's nystagmus, are other examples of the same condition.

Although removed from their area of conflict by the development of conversion, these individuals usually are returned to a modified form of duty or occupation after recovery. Such persons seem to suffer enough mental anguish to become incapacitated in one but not all forms of occupation. In other words, their ability to assume a less important job after recovery tends to prove that their suffering with conversion in the original job setup was minimal and not pronounced enough to bar recovery, in contrast to their maximal incapacity of performance.

The ocular manifestations of hysteria in relation to flying were studied extensively by Ironside and Batchelor.[6] They reported that these diabilities as well as their accompanying complaints were in terms of performance of duty. For example, patients often complained that they were no longer able to judge distances when flying in formation or when landing. This manner of complaining is characteristic of hysteria. Rather than expressing pain or

suffering, the patients themselves ordinarily expound their inability to do a job. Indeed, the idea of the job appears to be paramount in their preoccupations. In the present case, in view of the patient's assignment as a military policeman, it is believed that the paralysis of the right hand was an appropriate somatic compliance for the physical expression of a psychic conflict.

CASE REPORT

A 29-year-old, left-handed sergeant assigned to the Military Police was admitted to this hospital on 2 October 1956 because of inability to extend his right hand. Due to this disability, his commanding officer had found him unfit for duty.

This soldier had many reasons to want to stay in the Army. He had had considerable experience in the military. From 1945 to 1948 he had served satisfactorily as an infantryman and had been discharged a corporal. In 1953 he joined the National Guard and was soon promoted to the rank of sergeant. Recent layoffs in his seasonal work as a laborer had prompted him to consider the attractions of active duty. For this father of five children, these attractions were in terms of financial security and opportunity for advancement.

In rejoining the Army, his plans were for returning to the Infantry and the familiarity of its routine, where, because of his past experience, he could more easily retain his rank of sergeant. After a few weeks in a refresher course at a basic training center, he gained confidence by again performing in the Army and looked forward to a permanent Infantry assignment. Instead he was assigned to the Military Police.

This came as a great shock and disappointment. He felt inadequate as a military policeman and became concerned about the preservation of his rank. He complained to the assignment section in the following terms: "I cannot see myself with a military police assignment. I know nothing about it. I want to be in the Infantry where I know my work and can teach classes." He was ordered to report to his duty station after a short leave.

The day prior to returning to duty he awakened with a paralysis of his right hand and went to a military dispensary for treatment. He reported, and saluted the medical officer, who noted that "on saluting, the patient let his right hand fall amiss without any control." The hysterical nature of this condition was easily established by the absence of organic findings, and the patient was ordered back to duty. Two days after his arrival at his station, he saluted his commanding officer with an awkward gesture, and was ordered to the hospital with a suggestion of an assignment other than the Military Police.

The past history of this patient revealed that as far back as he could remember he had been inadequate and insecure. He quit school for fear of failure, in spite of his teacher's expectation that he would attend college. His choice of work was for menial labor, which was

inferior to his natural endowments, but assured him of faultless performance.

Upon admission to the hospital, the patient emphasized his inability to do duty because of paralysis of his right hand. He complained: "I cannot salute and I cannot handle a gun with this hand; it has to be treated!" In the general plan of treatment, however, his hand was practically ignored. Physical therapy was prescribed, but as a device for the patient to save face in front of his fellow patients. Psychotherapy also was accessory.

It was considered that external manipulation, by returning this military policeman to the Infantry, would restore his normal state of health. After official confirmation of his reassignment by the military authorities, the patient's improvement became obvious. He announced that he could extend his hand again. His treatment was completed with further psychotherapy, and after two and a half months of total hospitalization he returned to duty confident of his ability to carry on in the Army as a combat infantry sergeant.

DISCUSSION

We have mentioned that a paralysis of this patient's right hand was an appropiate somatic compliance for the reception of a psychic conflict centered around his duties as a military policeman. Although it would have been possible for this soldier to display another form of conversion hysteria, it would have required a conflict in another area. It is inconceivable that his becoming blind like an airplane pilot, or paralyzed like a foot soldier, could have solved his problems. Even paralysis of his left hand would have been illogical and ineffective. In that event, the chances are that the military policeman would have remained on duty and, being left-handed, he would have suffered in vain.

The patient's conflict was connected with his job, where his self-esteem and financial security became endangered by anticipated failure and consequent reduction in rank. The only way out of this situation was by inability to perform the necessary duties of saluting and handling a gun with his right hand. This meant that he could not carry out important functions of a military policeman. In addition, as an individual, his right hand was the least important of the two; being left-handed, he was able to satisfy his customary needs. His choice of symptom was indeed the least disadvantageous and at the same time the most rewarding. At the expense of only minimal discomfort, the patient achieved a maximal benefit by the removal of an anxiety-producing situation.

SUMMARY

A case of hysterical paralysis of the right hand in a left-handed military policeman is presented, and the specific form taken by

the disease in relation to the assignment is stressed. An important function of the assignment and the function least important to the individual—use of the right hand—fell prey to the process of conversion. The choice of this hysterical symptom seems to have been determined by the maximal benefit gained in return for the minimal discomfort suffered under the condition existing.

REFERENCES

1. Ferenczi, S.: *Further Contributions to the Theory and Technique of Psycho-Analysis.* Compiled by John Rickman; author translated by Jane Isabel Suttie and others. Hogarth Press, Ltd., London, 1950. pp. 115; 21-22; 89-118.

2. Janet, P.: *Major Symptoms of Hysteria.* The Macmillan Co., New York, N. Y., 1907. pp. 319-337.

3. Fenichel, O.: *The Psychoanalytic Theory of Neurosis.* W. W. Norton & Co., Inc., New York, N. Y., 1945. pp. 13-14; 183; 224-228.

4. Belgrano, V., and Giordano, G. B.: Sur la camptocormie. *Rev. neurol.* 79: 25-35, Jan. 1947.

5. Hamlin, P.: Camptocormia: hysterical bent back of soldiers; report of 2 cases. *Mil. Surgeon* 92: 295-300, Mar. 1943.

6. Ironside, R., and Batchelor, I. R. C.: Ocular manifestations of hysteria in relation to flying. *Brit. J. Ophth.* 29: 88-98, Feb. 1945.

THE GP AND AVIATION MEDICINE

Airline passengers almost never come in contact with the aviation medical specialist, and for good reason: he is concerned with the medical and allied problems of aviation—to make flight safer, more reliable, and more comfortable for more people. Medical practitioners in private practice are the ones to whom prospective passengers turn. Several excellent texts and references on aviation medicine are readily available. Chief among these are Armstrong's "Principles and Practice of Aviation Medicine," McFarland's "Human Factors in Air Transportation," "Aviation Medicine Practice" prepared by the Bureau of Medicine and Surgery of the Department of the Navy, and the U. S. Air Force's "Flight Surgeon's Manual."

—FREDERICK S. SPIEGEL, Lt. Col., USAF (MC)
in *Journal of the American Medical Association,*
p. 208, Sept. 21, 1957

A MESSAGE FROM THE A. M. A.

During May and June, the House and Senate Joint Committee on Atomic Energy held eight days of public hearings on the nature of radioactive fallout and its effects on man. The hearings covered, in detail, the whole cycle of fallout from its inception in the detonation of nuclear weapons, through its scattering about in the atmosphere and descent to earth, and finally its uptake by and effect on human beings, animals, and vegetation. Some fifty experts were invited to present scientific testimony ranging from physics to pathology and from geology to genetics, as it relates to fallout.

One point the Committee was interested in was whether scientists, many of whom are employed by Government agencies, felt free to work and exchange information in the sciences related to fallout. The weight of the testimony was that such freedom exists. Another point the Committee was interested in, and one on which the testimony was not so satisfying, according to the Committee report, is whether or not information on fallout and its effects is reaching the public. Information on the biological effects of radiation has been presented to the public in widely read reports by the British Medical Council and by the National Academy of Sciences. These reports contain some information directly applicable to the fallout question.

In its summary of key points, the Joint Committee outlined seven general observations made on the results of the hearings. They are as follows:

1. Origin of Fallout. It was pointed out that all nuclear explosions can be expected to produce some radioactive materials. However, certain kinds of explosions produce very much less radioactivity than others. Although there is no such thing as an absolutely "clean" weapon (that is, there is no such thing as a nuclear weapon detonation completely free of accompanying radioactivity), the amount of the radioactivity produced can be substantially altered in relation to the size of the explosion.

2. Distribution of Fallout. There was substantial, but far from complete, agreement on what happens to radioactive debris produced in man's environment, how much is there now, how and

From the Council on National Defense of the American Medical Assocation. The views and opinions expressed are not necessarily those of the Department of Defense. —*Editor*.

where it is distributed, and how much is in man himself. There was considerable evidence presented to indicate that in no part of the atmosphere is fallout uniformly distributed and that, therefore, the effects of fallout on the world's population could not necessarily be expected to be uniform.

3. Biological Effects of Radiation. There was general agreement that any amount of radiation, no matter how small a dose, increases the rate of genetic mutation in a population. There was, on the other hand, a difference of opinion as to whether a very small dose of radiation would produce, similarly, an increased incidence of such somatic conditions as leukemia or bone cancer, or a disease of life expectancy, in a population.

4. Tolerance Limits. There was general agreement that there is a limit to the amount of radioactivity and, hence, to the amount of fission products that man can tolerate in his environment. The extent to which existing and future generations will be affected by man-made radiation was shown to be intimately tied to certain decisions, moral as well as scientific.

5. Effects of Past Tests. It was clearly shown that man's exposure to fallout radiation, including strontium 90, is and will be in general small, *for the testing already done,* compared with his exposure to other "normal background" sources of radiation (a fraction of 1 to 10 per cent), and even compared with variations in "normal background" sources. But it was not agreed on how this information should be interpreted.

6. Effects of Future Tests. There were differences of opinion on how to forecast the consequences of further testing. The differences hardest to reconcile appear to be those concerning the biological effects of radiation. Pending a resolution of differences, it would appear from the information presented, that the consequences of further testing over the next several generations at the level of testing of the past five years could constitute a hazard to the world's population.

7. Effects of Nuclear War. The catastrophic nature of the radiation effects from a multi-weapon (atomic and hydrogen bombs) attack on the United States were clearly portrayed. This, of course, could be applied to any nation.

The 19-page Committee print of the report entitled "Summary-Analysis of Hearings, May 27-29 and June 3-7, 1957 on the Nature of Radioactive Fallout and Its Effects on Man" was printed by the U. S. Government Printing Office for the use of the Joint Committee on Atomic Energy. Those desiring a copy of the report may make request through this source and reference.

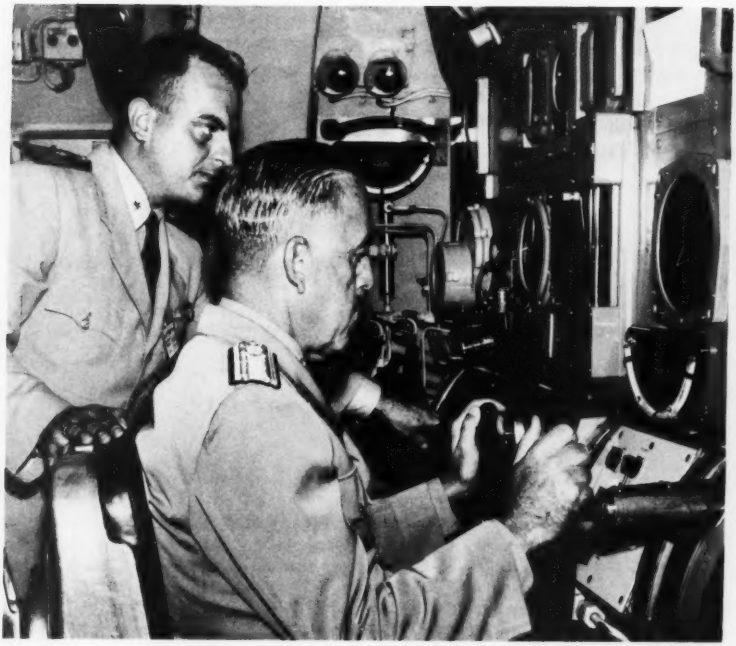
MEDICAL OFFICERS OF 16 COUNTRIES GIVEN GRADUATE COURSE BY NAVY

Twenty-eight medical officers from the navies of 16 friendly nations on 8 November will complete a two months' graduate course in medical management and preventive medicine at the U. S. Naval Medical School, Bethesda, Md. The courses are being given under the supervision of Captain Calvin B. Galloway, MC, USN, commanding officer of the School, under the Mutual Security Program.

First row, left to right: *Lt. Noriyuki Fujioka, Japan; Capt. Chol Yu, Korea; Lt. (jg) Tezel Burbanettin, Turkey; Capt. Prakob Chaksurak, Thailand; Lt. Luis Morel, Dominican Republic; Comdr. Luis Batto Vargas, Peru; Col. Hospicio L. Solidum, Philippines; Lt. S. T. Wang, Taiwan; Maj. Avelino U. Tayag, Philippines.* Second row, left to right: *Capt. Virgilio S. Zamora, Philippines; Lt. Comdr. Mitsuo Wachi, Japan; Lt. Comdr. Kyong Han Chong, Korea; Col. Luigi Campanelli, Italy; Lt. Comdr. Joaquin Diaz Gonzalez Roca, Mexico; Lt. Laborde Edg Titus, Haiti; Lt. Comdr. Kamil Kusuoglu, Turkey; Lt. Comdr. Necati Keskin, Turkey; Comdr. C. Y. Su, Taiwan; Comdr. Carlos Cepeda, Chile.* Third row, left to right: *Capt. Calvin B. Galloway, MC, USN, commanding officer, U. S. Naval Medical School; Comdr. Akira Takagi, Japan; Lt. Antonio Venegas, Chile; Lt. Enzo Tarani, Italy; Lt. (jg) Francisco J. Garcia Puig, Cuba; Commodore Johan Greve-Brun, Norway; Lt. Seni Wattasingh, Thailand; Comdr. Hans Bierbaum, Germany; Comdr. Orhan Mordalga, Turkey; Lt. Comdr. Bruce W. Halstead, MC, USNR, staff officer, U. S. Naval Medical School. (Lt. (jg) V. N. Ha, Viet Nam, is not in the photograph.)*

Didactic work is being supplemented by visits to numerous military and civilian installations. The students were graciously received by the Honorable Dr. Frank B. Berry, Assistant Secretary of Defense (Health and Medical), and were impressed by the complexities of operations observed in the Pentagon. They also visited the clothing center of the U. S. Marine Corps and the U. S. Army at the Quartermaster Corps Depot, Philadelphia, Pa., the U. S. Naval School of Aviation Medicine, Pensacola, Fla., the experimental diving unit of the Naval Gun Factory, Washington, D. C., and the United Nations building in New York.

ADMIRAL HOGAN VISITS U. S. S. SEAWOLF



Rear Admiral Bartholomew W. Hogan (right), Surgeon General of the U. S. Navy and Chief of the Navy's Bureau of Medicine and Surgery, is shown aboard the nuclear-powered submarine *Seawolf* recently in Groton, Conn., as Lieutenant Commander John H. Ebersole, the ship's medical officer, demonstrates the airplane type controls used in the control room. Admiral Hogan also paid informal visits to the U. S. Naval Medical Research Laboratory and the Station Hospital, Submarine Base, during his stay in New London, Conn.

Admiral Hogan was elected to the Board of Trustees of the American Hospital Association at the 59th annual meeting in Atlantic City, N. J. He has served as delegate at large of the American Hospital Association and as a member of the American College of Hospital Administration.

GENERAL HEATON HONORED BY BRAZILIAN OFFICERS IN WALTER REED CEREMONY

Brigadier General Arthur Augusto Alcantara, Commanding General of the Central Hospital of the Army, Rio de Janeiro (left) and Colonel Paulino DeMello, Director of the Policlinica of the Army, Rio de Janeiro (right) recently presented a medal and diploma of honorary membership in the Brazilian Academy of Military Medicine to Major General Leonard D. Heaton, Commanding General of Walter Reed Army Medical Center. The Brazilian medical officers visited Walter Reed as part of a three-week orientation and observation tour of the United States. Major General Silas B. Hays, the Surgeon General, U. S. Army, also was presented a medal of honorary membership at a ceremony in his office.

After leaving Washington, General Alcantara and Colonel DeMello visited DeWitt Army Hospital, Fort Belvoir, Va., the Louisville (Ky.) Medical Depot, Fitzimmons Army Hospital, Denver, and the Brooke Army Medical Center, San Antonio.

OFFICIAL DECORATIONS

The following awards have been announced by Departments of the Navy and Air Force since 1 August 1957:

Legion of Merit

Wayne O. Kester, Brig. Gen., USAF (VC)*
Olin F. McIlnay, Maj. Gen., USAF (MC)*
Edward J. Tracy, Brig. Gen., USAF (MC)*
Mitchell M. Young, Col., USAF (MSC)

Distinguished Flying Cross

David G. Simons, Maj., USAF (MC)

Soldiers Medal

Walter A. Poznanski, Capt., USAF (MC)

Commendation Ribbon

Francis A. Chevrefils, Comdr., MSC, USN
Elmer A. Lodmell, MC, USA
Willie C. Magness, Col., USAF (MSC)
Robert R. Miller, USAF (VC)*
Francis W. Pruitt, MC, USA

*First Oak Leaf Cluster

DEATHS

COOPER, Robert Arthur, Captain, MC, USN, of San Diego, Calif.; stationed at the U. S. Naval Hospital, San Diego; graduated in 1930 from the University of Minnesota Medical School, Minneapolis, Minn.; appointed Lieutenant (junior grade) 13 June 1930; died 8 September 1957, age 50, in San Diego, of Hodgkin's disease.

RUSHTON, Harry, Captain, VC, USAR, of Flint, Mich.; stationed at the 168th Medical Detachment, Berlin, Germany; graduated in 1941 from Ontario Veterinary College, University of Toronto, Ontario, Canada; commissioned a Captain in the Army of the United States and ordered to active duty 2 January 1951; died 2 August 1957, age 40, in Germany, of acute cardiac failure with pulmonary edema.

SCHNEIDER, Patricia Marguerite, Captain, ANC, USA, of Ocala, Fla.; stationed at the 10th Field Hospital, Germany; graduated in 1948 from the School of Nursing, Charity Hospital of Louisiana, New Orleans, La.; commissioned Second Lieutenant in the U. S. Army Reserve 14 October 1948; ordered to active duty 8 November 1948; commissioned Second Lieutenant in the United States Army 30 November 1950; died 15 August 1957, age 31, at the U. S. Army Hospital, Wurzburg, Germany, of cardiac arrest.

WRIGHT, Janice Rhex, First Lieutenant, USAFR (NC), of Pocahontas, Va.; stationed at the U. S. Air Force Hospital, Chateauroux Air Base, France; St. Mary's Hospital School of Nursing, Huntington, W. Va.; commissioned a Second Lieutenant in the U. S. Air Force Reserve 23 March 1951; ordered to active duty 15 November 1953; died 24 August 1957, age 27, in Chateauroux, of asphyxiation.

OFFICERS CERTIFIED BY SPECIALTY BOARDS

Supplementary Listing

According to information from the Offices of the Surgeons General of the military medical services, the following regular Medical Corps officers have been certified by the boards indicated since the listings published in previous issues of this *Journal*.

American Board of Ophthalmology

Robert W. Neidlinger, Capt., USA
Robert H. Palmer, Lt. Comdr., USN

American Board of Surgery

Ralph R. Chapman, Lt. Col., USA

American Board of Physical Medicine and Rehabilitation

Physical Medicine

William M. Gilmore, Jr., Capt., USA
Richard S. Munger, Maj., USA
Frederick J. Sheffield, Capt., USA

American Board of Preventive Medicine

Public Health

Alfred G. Siege, Lt. Col., USA

Aviation Medicine

Robert H. Adams, Maj., USAF
Charles A. Berry, Maj., USAF
William G. Bradley, Lt. Col., USAF
Richard S. Fixott, Col., USAF
Harold E. Gillespie, Capt., USN
Rufus R. Hessberg, Jr., Lt. Col., USAF
William C. Marett, Lt. Col., USAF
Robert E. Shirley, Maj., USAF
Raymond A. Yerg, Lt. Col., USAF

ERRATUM: It is regretted that in printing the article by Dr. Charles G. Wilber on "Water Requirements of Man" that was published in the August 1957 issue of this Journal an error was introduced in the next to last line on page 1124. The word "Barometric" should have read "Vapor."—*Editor.*

CORRESPONDENCE

Honorable Frank B. Berry, M. D.
Assistant Secretary of Defense
Washington, D. C.

Dear Dr. Berry:

During these times of economy drives in Government, I would like to take this opportunity to bring to your attention the splendid work that is being done at the Armed Forces Institute of Pathology not only for the military but also for the civilian population.

The Armed Forces, through its staff pathologists, have given consultation services to the pathologists in all communities. They have also served as a clearing house for information of particular value to certain geographical locations. Their publications that are available are outstanding and are available at a nominal fee. The refresher courses offered at the Institute to military and civilian pathologists are a credit to the Armed Forces.

Through the guidance of extremely capable men who have headed the Institute, particularly since the postwar years, and now under the competent direction of Captain William M. Silliphant, MC, USN, the organization has reached the point of international recognition. On the domestic scene, it has provided material for seminars for medical societies such as the American College of Pathologists and many others.

Although a Government agency, the Institute is in no way in conflict with civilian institutions. It is unfortunate, indeed, that the work of the Institute is not brought to the public as a fine example of how money is being spent by the military to promote health and the welfare of the country.

I would, therefore, like to take this opportunity to express through your office my sincerest appreciation to the Director of the Armed Forces Institute of Pathology for making available the full consultation services of the staff pathologists to this community.

MARVIN N. SOLOMON, M. D., F. A. C. P.
Pathologist, Newcomb Hospital
66 South State Street
Vineland, N. J.

Reviews of Recent Books

STRESS AND STRAIN IN BONES, Their Relation to Fractures and Osteogenesis, by *F. Gaynor Evans,* Ph. D. American Lecture Series, Publication No. 296, The Bannerstone Division of American Lectures in Medical Physics, edited by *Otto Glasser,* Ph. D. 245 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $6.50.

This book is a detailed report of the more significant experimental investigations on stress and strain in bones. The author has carefully reviewed the literature on this subject and has critically weighed the conclusions drawn by many investigators, including himself. The 15 chapters are devoted to the engineering principles involved and the results obtained in many investigations to determine the tensile, compressive, shearing, torsion, bending, and fatigue strength of bones of man and other animals. Conclusions and opinions concerning the significance of the results of these studies are presented briefly. A glossary of engineering terms is included and will assist the clinician in his effort to glean a significant fact to help him in the practice of orthopaedics. The list of references is comprehensive.

The average reader may be startled to learn that one investigator elected to study bone "of an ox six years of age, a mule, and the femurs of two women 42 and 90 years of age," and he may not be able immediately to grasp the importance of studying the comparative breaking strength of the bones of Polish cows and Dutch cows, but he will certainly be rewarded by learning many important facts to add to the little understood role of stress and strain in fracture productions as well as healing. The investigator will find much to interest him in this timely review and he should find it to be an indispensable reference. —*CLIFFORD A. STEVENSON, Capt., MC, USN*

CLINICAL CARDIOPULMONARY PHYSIOLOGY, Sponsored by the American College of Chest Physicians, edited by *Burgess L. Gordon,* M. D., et al. 768 pages; 248 illustrations; 32 tables. Grune & Stratton, Inc., New York, N. Y., 1957. Price $15.75.

Under the sponsorship of the American College of Chest Physicians, an editorial board headed by *Burgess L. Gordon,* M. D., and consisting of Albert H. Andrews, Jr., M. D.; Alvan L. Barach, M. D.; John F. Briggs, M. D.; Edwin R. Levine, M. D.; George R. Meneely, M. D.; Hurley L. Motley, M. D.; Maurice S. Segal, M. D.; and Harold G. Trimble, M. D., has effectively assembled 39 subjects dealing with cardiac and pulmonary physiology, largely as they relate to clinical medicine today. The 52 contributing authors are recognized authorities in their field.

Here in a single volume is a summarization of clinical and physiologic data pertinent to cardiac and pulmonary problems that is so comprehensive it at once seems a little overwhelming. Although the primary purpose of this volume is to provide an understanding of altered physiologic mechanisms, it would be unjust to fail to mention that much space is advantageously given to clinical descriptions, diagnostic studies, and therapeutic measures, particularly in so far as they alter disease states.

Almost of necessity there must be some overlapping of subject matter in the various sections, and, as would be expected, this has created repetition of some basic and applied data. While adding to the bulk of the work, this very repetition has immeasurably enhanced its value as a reference source inasmuch as each contributing author's section "stands alone." This, of course, obviates the need for skipping from one section to another in search of basic or explanatory data. There has long been a great need for a collection such as this for it is without precedent and there is no comparable volume of its scope available today.—*FRANK L. MILLER, Lt. Col., MC, USA*

OBESITY, Its Cause, Classification, and Care, by *E. Philip Gelvin,* M. D., F. A. C. P., and *Thomas H. McGavack,* M. D., F. A. C. P. 146 pages. Paul B. Hoeber, Inc., Medical Book Department of Harper & Brothers, New York, N. Y., 1957. Price $3.50.

This volume represents a 10-year experience in an outpatient clinic devoted solely to the management of obesity. Chapters are devoted to pertinent basic biochemistry, and consideration of endocrine and metabolic factors, but the best section is undoubtedly the one dealing with diet. The authors emphasize correctly the necessity for constructing a weight-reducing diet that will establish proper eating habits after termination of treatment, and discuss the deficiencies in the use of the high-protein diet and the Pennington high-fat diet with this in mind. In attempts to arrive at a standardized reducing diet such factors as expense, availability, popularity, and variability have been carefully considered. Emphasis is placed on the size of portions rather than adherence to calories per se.

Three chapters are devoted to the use of various drugs in the treatment of obesity. The enthusiasm in this text for amphetamine derivatives is not shared by many other workers in the field, but appears justified on the basis of a fairly extensive objective clinical study which is well documented. Other subjects, such as the use of cortisone or prednisone in the therapy of special forms of obesity, should be viewed with a high degree of skepticism and are not well substantiated by figures or case material although reference is made to some thirty patients.

The bibliography covers 131 references to various aspects of the subject and serves as an excellent springboard for more detailed study. There were, however, no references to psychologic factors in the genesis of obesity although an impressive literature has accrued on this

subject. Only one page is devoted to this subject in the text and, similarly, little is said about the psychologic factors that play an important role in the patients ability to proceed with treatment effectively. This is perhaps a reflection of the nature of outpatient practice.

This book is aimed at the general practitioner or internist, and the authors are to be commended for its simplicity, directness, and emphasis on the practical aspects of therapy. If it does nothing else but illustrate our extraordinary lack of knowledge about this important subject, it will have served its purpose.—*PAUL J. ROSCH, Capt., MC, USA*

TEXTBOOK OF PATHOLOGY, With Clinical Applications, by *Stanley L. Robbins,* M. D. 1,351 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1957. Price $18.

In the preparation of this textbook of pathology, Dr. Robbins set out to produce a volume particularly for students and clinicians. He has not only accomplished this but also written a book which will be useful to pathologists. The subject matter is handled in logical sequence beginning with the normal, going through etiology, pathogenesis, pathologic alterations, and ending with clinical correlations. General pathology and principles are presented in the early chapters to be followed by organ and systemic pathology. The subject matter of pathology is covered quite fully with major emphasis placed on the commoner lesions. Uncommon disorders might occasionally be given greater prominence but, of course, there is a limit to the size a text may assume. Some chapters have been prepared by specialists in particular fields.

The book is well bound, and printed accurately in clear, legible type on good quality paper. Numerous illustrations of superb quality are employed throughout the text. References at the end of some chapters might well be expanded in number but those given have been well chosen. The index, a most important part of any text, is extensive and permits ready location of desired material.

One of the most outstanding accomplishments of this book is its easy readability and ready comprehension. Dogmatism is avoided throughout, controversial and unsettled problems are discussed fully, and various opinions presented with attempts to reconcile the differing views wherever possible. Clinical correlations and applications are particularly useful. This book is to be recommended highly for medical students and clinicians, and the practicing pathologist will also find it a source of much valuable information.—*HOWARD A. VAN AUKEN, Col., MC, USA*

PRACTITIONERS' CONFERENCES Held at The New York Hospital-Cornell Medical Center,. Volume 6. Edited by *Claude E. Forkner,* M. D., F. A. C. P. 378 pages; illustrated. Appleton-Century-Crofts, Inc., New York, N. Y., 1957. Price $6.75

This is the sixth in a series of conferences held at the New York Hospital-Cornell Medical Center and presents a variety of disease entities in panel form. There are 15 chapters dealing with such diver-

444645 O - 57 - 10

sified subjects as, "Should Patients be Told the Truth About Serious Illness," to discussions on cancer of the thyroid, prostate, esophagus, lung, and bone. Panel discussions are also presented on heart disease, dermatology, endometriosis, encephalitis and parkinsonism, gout, trichinosis and portal hypertension. A chapter on "Consultations with Anesthesiologists" provides excellent coverage of current thoughts on the types of anesthetic agents employed, their effects on the body, and their dangers.

The presentations are spirited, and are aimed at the practical side of the practice of medicine. In several chapters the discussants refer to slides they are showing but in such a fashion that it is of little or no benefit except for those physically present. A few words of edited summary would save space and readers' time at these points. All the pertinent facts elicited in the discussions are aptly and systematically summarized at the conclusion of each chapter. In addition, a small but well-chosen bibliography on the subject is also listed. This series of conferences would be a welcome addition to a general practitioner's library and to hospital and medical school libraries. It is too diversified for the specialist. —*JULES J. McNERNEY, Lt. Col., MC, USA*

HANDBOOK OF LEGAL MEDICINE, by *Louis J. Regan,* M. D., LL. B., and *Alan R. Moritz,* M. D. 201 pages; illustrated. The C. V. Mosby Co., St. Louis, Mo., 1956. Price $3.90.

The first 95 pages of this book concern relationships between the physician, the patient, and the law. The balance of the volume deals with scientific, medicolegal investigations. In addition, there is a glossary of 12 pages, a list of references for more detailed information, and a well-compiled index.

This small, compact volume covering the more important highlights of medicolegal ramifications is well written in clear and distinct form, with good illustrations. It should be read by all physicians and dentists, as well as students in both professions. The book would be excellent reading, as well, for nurses, particularly nurse supervisors and hospital administrators. It has a wealth of knowledge condensed into readily readable size. —*FRANK P. GILMORE, Rear Adm., MC, USN*

THE FAMILY IN PSYCHOTHERAPY, by *C. F. Midelfort,* M. D. 203 pages. The Blakiston Division, McGraw-Hill Book Co., Inc., New York, N. Y., 1957. Price $6.50.

In this compact volume the author describes his experiences with psychiatric patients admitted to the La Crosse Lutheran General Hospital. In this institution relatives have long been allowed to stay with mental patients to assist in occupational, recreational, and insulin therapies. Dr. Midelfort reports on patient treatment in which relatives take part in therapeutic interviews.

The book is largely composed of case histories with special emphasis on schizophrenia, depression, paranoid illness, psychopathic per-

sonality, and psychoneurosis. The reader will find innumerable thought-provoking clinical observations: depressed patients are the victims of the restricting cultural traditions of families of uniform ethnic, religious, and family backgrounds. Also: the psychiatrist cannot approach the paranoid patient directly, but can do so through common activities with the patient's children. The thesis which Dr. Midelfort's case histories illustrate is that mental illness in the family is a product of genetics, and of social and cultural heredity. The factors that play a dynamic part in mental illness are at work in the family, and to treat only one patient from the family without the others can influence only a part of the difficulty, leaving much untouched.

Dr. Midelfort's book is a significant contribution to the growing trend toward greater inclusion of the patient's family milieu in psychotherapy. In addition, it is an excellent illustration of the advantages of psychiatric treatment within the setting of the general hospital. One cannot fail to be impressed with Dr. Midelfort's many successfully treated cases (although his failures are discussed very candidly) and with the modest expenditures of the therapist's time which were often involved. There is much in the area of practical handling of patients and families which has been omitted from the book: one patient's husband and small son remained in the hospital with her during her acute psychosis, a therapeutic maneuver which must have required a great deal of flexibility on the part of the staff.

Dr. Midelfort has made an important contribution to psychotherapy and his book is strongly recommended for all concerned with the treatment of mental illness. —*JOHN C. MEBANE, Lt. Col., USAF (MC)*

Zinsser's BACTERIOLOGY, by *David T. Smith,* M. D., *Norman F. Conant,* Ph. D., et al. 11th edition. 953 pages; illustrated. Appleton-Century-Crofts, Inc., New York, N. Y., 1957. Price $12.

This is a new edition of a time-honored publication that has always been a valuable asset to students, instructors, bacteriologists, epidemiologists, and laboratory staffs. The objective of the original authors, Hiss, Zinsser, and Bayne-Jones has again been presented in this edition, extending not only the biologic characteristics of the organisms, but also the reactions of living tissues to bacteria and their metabolic products. In this manner the text becomes of equal value to the bacteriologist, the epidemiologist, the public health profession, and to the student. The philosophy of the presentation has been to substantiate the basic biologic approach to bacteriology, and at the same time to emphasize the public health significance and the practical clinical importance of certain of these biologic characteristics of organisms. Epidemiological characteristics also are included in each presentation, thus extending the value of this publication.

This edition has undergone extensive revisions and rewriting in the interest of presenting as completely as possible consolidated current information on each subject. Within the past five years, since

the advent of the tenth edition, nearly twice as many significant publications in the field of microbiology have appeared as in the previous five years. Advancement in the field of bacterial physiology, immunology, and viruses have been incorporated in this text. A new chapter covering the academic aspects of blood grouping and immunohematology also has been added. This edition also includes information on the susceptibility effects of the newer antibiotics on specific organisms. Each chapter closes with an excellent list of references.

This text is an excellent consolidation of technical material derived from current investigations on each group of organisms. It is highly recommended for inclusion in the technical libraries of laboratories, for basic science students, and for individuals concerned with epidemiology or diagnostic laboratory facilities.

—WILLIAM H. LEE, Lt. Col., USAF (MSC)

THE DIAGNOSIS AND TREATMENT OF ENDOCRINE DISORDERS IN CHILDHOOD AND ADOLESCENCE, by *Lawson Wilkins*, M. D. 2d edition. 526 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $17.50.

This classical work in pediatric endocrinology has been extensively revised and expanded in this second edition. Written and presented for the clinician, the case reports, original pictures of clinical material, and easy readability greatly enhance the value of this book. Of particular interest in this revision are the newer diagnostic methods, the discussions of sex chromatin, metabolism of carbohydrates, and calcium and phosphorous. The chapter on the adrenogenital syndrome has been radically revised in the light of the therapeutic response to cortisone. The one on the hormone assays and tests and their diagnostic applications and limitations is exceedingly well presented. Differential diagnosis is stressed. There is an extensive bibliography at the end of each chapter, which is subdivided according to the subjects with which they deal. This most authoritative and up-to-date presentation of endocrinology, written by an author who has made notable contributions in this field, should be in the library of those engaged or interested in the treatment of endocrine disorders in the pediatric age group.

—ERNST R. MOELLER, Capt., MC, USN

THE NURSE AND THE OUTPATIENT DEPARTMENT, by *Audrey Windemuth*, R. N., B. S. 580 pages. The Macmillian Co., New York, N. Y., 1957. Price $6.50.

The author, with her vast experience, has a comprehensive knowledge and understanding of the subject of this new book which deals exclusively with the nurse and the outpatient department. Her style of writing makes for easy and enjoyable reading and arouses an interest to read further. The position of the outpatient department in functioning between the hospital and the community health activities is clearly and concisely outlined. While all outpatient department activities are covered briefly, particular emphasis is placed on teaching patients better health measures which will aid in promoting a healthier com-

munity. The relationship of the doctors, dietitians, physical therapists, occupation therapists, social workers, and public health workers in regard to the total patient care is stressed in a manner that clearly depicts each role.

Since the age of rapidly expanding medical care through outpatient service the nursing profession has been in need of an adequate textbook for teaching and training personnel. Miss Windemuth's volume fills this need most admirably. It is recommended as a reference for graduate nurses concerned with outpatient nursing and should be of particular value to all schools of nursing. It contains an excellent index with cross-reference to facilitate its use.

—*ALICE E. SOLTZ, Maj., ANC, USA*

MAGNETIC REMOVAL OF FOREIGN BODIES, The Use of the Alnico Magnet in the Recovery of Foreign Bodies from the Air Passages, the Esophagus, Stomach and Duodenum, by *Murdock Equen,* M. D., F. A. C. S. 94 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $4.50.

The author has drawn upon more than 12 years of experience with Alnico Magnets in removal of ferrous alloy (magnetic) foreign bodies from the tracheobronchial tree, esophagus, stomach, and duodenum. His monograph is written in an informal, conversational style and organized into seven short chapters. Much of the contents of the book is devoted to case histories depicting the various situations that confront the patient, parents, physician, and the specialist when foreign bodies become lodged in the air passages or the upper gastrointestinal tract. Photographs of the various modifications of the small semipermanent magnets utilized for removal of magnetic foreign bodies from various levels in the air passages and upper gastrointestinal tract are included together with an ample array of reproductions of roentgenograms demonstrating almost every conceivable foreign body problem.

Dr. Equen reports phenomenal success employing his technics with the magnet under fluoroscopic guidance in over two hundred cases, although an occasional unsuccessful case is reported. This reviewer does not fully share in the policies of the author as to the early removal of small foreign bodies from the stomach and duodenum which, by and large, are prone to continue their harmless passage on through the gastrointestinal tract within a few days. It is of interest that of 19 metallic foreign bodies retrieved from the duodenum, 10 had been swallowed on the day of removal. Notwithstanding Dr. Equen's keen advocacy of magnetic methods, he does include remarks on disadvantages, contraindications, and precautions that are felt to be quite logical.

This book is recommended to professional libraries that provide references for any sizable group of physicians; it can be read with interest by the general practitioners, general surgeons, chest surgeons, bronchoscopists, gastroenterologists, pediatricians, and roentgenologists.—*JOHN M. SALYER, Col., MC, USA*

DEVELOPMENTAL ABNORMALITIES OF THE EYE, by *Ida Mann,* C. B. E., M. A. (Oxon.), D. Sc., M. B., B. S. (Lond.), F. R. C. S. (Eng.), F. R. A. C. S. 2d edition. 419 pages; illustrated. J. B. Lippincott Co., Philadelphia, Pa., 1957. Price $15.

This second edition of what has become a classic in ophthalmology deserves the praise which it will continue to receive. A subject not appealing to many clinicians is tied in so closely with problems of practice that the book is fascinating to read. It progresses logically from the discussion of the development of the eye from conception, through its intrauterine phase, and then through life. Finally, it considers those senile changes which are based on an hereditary background.

The discussion in sequence of events pertaining to individual structures is especially valuable for reference purposes. The anatomy is reviewed in detail in the process, and the differentiating points between developmental and disease processes are emphasized. This results in necessary duplication of material but makes reference much easier and conditions more readily understood. The illustrations are excellent and abundant.

This book will be especially valuable to the ophthalmologist since it was written by an ophthalmologist with that goal constantly in mind. It is highly recommended for inclusion in the libraries of ophthalmologists, geneticists, pediatricians, psychiatrists, neurologists, and all others interested in abnormalities of the eye.

—*VICTOR A. BYRNES, Brig. Gen., USAF (MC)*

A MANUAL OF PHARMACOLOGY and Its Applications to Therapeutics and Toxicology, by *Torald Sollmann,* M. D. 8th edition. 1,535 pages. W. B. Saunders Co., Philadelphia, Pa., 1957. Price $20.

Earlier editions of this manual have been in common use longer than almost any other textbook in the medical sciences except, of course, Gray's Anatomy; yet this volume is by the same author who, in 1917, wrote the first edition which has since been an important guide to the medical student, and especially to the pharmacologist.

As an aid to the student the sections in ordinary type in this edition, as in earlier ones, present "the material all students should aim to know" while the sections in small type contain important reference information. The bibliography of approximately 4,000 references is restricted to those publications since 1939. Earlier references are in other editions. Recognizing the difficulties of classifying drugs entirely by chemical nature or by physiologic action, the author has used both such as "sulfonamide compounds" and "convulsant poisons." Most frequent use is made of a chemical classification. There is no division into chapters.

The professional pharmacologist will continue to find the book very useful because of its wide scope and useful references. The medical

student and those in related fields may find the failure to follow more common arrangements and the lack of chemical information disadvantages. The space devoted to individual drugs bears little relation to their frequency of use. As instances, several times as much space is devoted to oil of turpentine as to meprobamate (consistently referred to as mepromate) which is dismissed with 16 lines of small type; the discussion of strychnine occupies eight pages and that of serotonin less than one-half; approximately the same amount of space is devoted to the use of bismuth in syphilis as to the use of penicillin in this disease.—*PAUL K. SMITH, Col., USAFR*

CIBA FOUNDATION SYMPOSIUM on the CHEMISTRY AND BIOLOGY OF PURINES. Editors for the Ciba Foundation: *G. E. W. Wolstenholme*, O. B. E., M. A., M. B., B. Ch., and *Cecilia M. O'Connor*, B. Sc. 327 pages; with 124 illustrations and structural formulae. Little, Brown & Co., Boston, Mass., 1957. Price $9.

In its treatment of the synthesis and biological activity of purines, this volume attains the high level of achievement which has characterized the recorded proceedings of previous Ciba Foundation Symposia. It can be expected to receive the careful attention of organic chemists concerned with the structure and synthesis of purines and of purine derivatives of known or potential biological significance. The collected papers also contain much that will be of similar importance to persons interested in fundamental research on cancer, enzymes, and the development of new chemotherapeutic agents.

Material pertaining to synthetic organic chemistry is concentrated upon the preparation of purines and of related compounds intended for testing as chemotherapeutic agents (*e.g.*, in acute leukemia), compounds which might be expected to occur in the course of the in vivo oxidation of purines, and those which might provide an improved understanding of nucleoside structure (*e. g.*, puromycin). Analogous subject matter is concerned with determinations of hydroxy purine structure, the chemistry of new purines of the B_{12} vitamin series, and the chemical transformation of purines into pteridines.

On the biochemical side there is an extended review of the recently enhanced state of our knowledge concerning purine biosynthesis, a discussion of the available evidence relative to the hypothesis that xanthine oxidase is a "key enzyme" in controlling the pool of biological purines, and a consideration of the relationship between biological activity and alterations in the molecular structure of puromycin. Finally, there is a paper on the biochemistry of 6-mercaptopurine, followed by a discussion of the clinical limintations of 6-mercaptopurine therapy, based upon the study of 18 patients with acute leukemia, and of 12 patients in the terminal stages of chronic myeloid leukemia. Only 7 of the former were treated with 6-mercaptopurine alone; 3 of these died without achieving remission. Seven of the 12 chronic myeloid leukemia patients received no benefit from treatment with 6-mercaptopurine —*THADDEUS J. DOMANSKI, Col., USAF (MSC)*

The Early Diagnosis and Treatment of ACOUSTIC NERVE TUMORS, by *J. Lawrence Pool*, M. D., and *Arthur A. Pava*, M. D. American Lecture Series, Publication No. 303, A Monograph in American Lectures in Surgery, edited by *Michael E. DeBakey*, M. D., and *R. Glen Spurling*, M. D. Neurosurgery Division, edited by *Barnes Woodhall*, M. D. 161 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $5.50.

This is a thorough, well-written study of a relatively infrequent type of brain tumor of primary interest to neurosurgeons. It is also of diagnostic interest to general practitioners, neurologists, radiologists, otolaryngologists, and internists because it is this group of physicians who most frequently have the opportunity of making the all-important early diagnosis.

The chapters relative to the differential diagnosis, signs, symptoms, and diagnostic procedures currently employed, are especially to be commended because of their completeness. In compiling the frequency of the various signs and symptoms the authors not only utilize their own series of 122 patients but also those of five other large series. The other important chapters are devoted to operative intervention with presentation of data on total versus subtotal removal, operative technic, and postoperative management. Mortality, complications, and sequelae from operative intervention are enumerated and analyzed with due emphasis on facial nerve paralysis and its subsequent treatment.

—*WILLIAM J. JAMES, Capt., MC, USN*

BASIC NUTRITION, by *E. W. McHenry*, M. A., Ph. D., F. R. S. (C.). 389 pages. J. B. Lippincott Co., Philadelphia, Pa., 1957. Price $5.

Practicability is the keynote of this book. Historical data, sources and requirements of the various nutrients are presented in a clear, concise, and factual manner. Emphasis throughout is on the need to consider the nutritional requirements of the individual. Arbitrary adherence to a prescribed dietary standard without giving thought to the factors affecting the requirements is discouraged. Flexibility in the selection of food to achieve adequate nutrition is recommended rather than advocating a rigid set of rules to follow. While it is shown that the nutritional requirements might be met by the use of a very simple selection of food, this is not advised from a practical point of view.

Special diets receive only brief notice, both as to types of diets discussed and as to space devoted to this subject. Here, too, caution is advised. The student might well heed the advice that there is benefit to be gained by both the hospital and the patient from limiting special diets to those that are really necessary. Attention is directed to the pitfalls of indiscriminate use of restricted diets. Dietary standards, principally those of the United States and Canada, are explained and omissions from these standards are pointed out. The evaluation of nutritional studies gives an insight into the value of these studies. From this introduction to the study of nutrition, the student should be well aware of the many facets of nutritional education.

—*HELEN M. DAVIS, Lt. Col., AMSC, USA*

PEDIATRIC CLINICS OF NORTH AMERICA, Symposium on Pediatric Hematology, May 1957. *Wolf W. Zuelzer,* M. D., Consulting Editor. 591 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1957. Price $15 per year of 4 books issued quarterly. Sold only by a year of four consecutive numbers.

Previous publications of these clinics have been excellent and this volume is no exception. The consulting editor states in the foreword that no attempt was made to cover the entire subject. Nevertheless most of the important aspects of pediatric hematology are covered expertly and concisely. The volume is obviously directed to those who have direct responsibility for the care of the child. The selected bibliography should make this a frequently consulted work. Deserving of special attention are the rational approach to the diagnoses of the pediatric anemias, Dr. Chown's refreshing style applied to the nonhematolytic anemias, and the language of genetics provided by Dr. Neal. The logical and practical approach made by Dr. Wheeler to exchange transfusion in erythroblastosis is alone worth the price of the book.—*LEO J. GEPPERT, Col., MC, USA*

THE SPECIALTIES IN GENERAL PRACTICE, edited by *Russell L. Cecil,* M. D., and *Howard F. Conn,* M. D. 2d edition. 780 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1957. Price $16.

The second edition of this book, first published in 1951, consists of 14 chapters each dealing with a different specialty field and written by a senior specialist in that field. Its purpose, to quote the editor, is to provide "a sort of ready handbook for the busy physician in which he might find brief and practical descriptions of how to handle the less serious problems in the various special fields." The fields of internal medicine and general surgery are not included, presumably on the basis that general practitioners are already familiar with the commoner conditions in these fields. The emphasis in the book is not on recent advances in the fields but rather on abbreviated textbooks dealing with the common conditions in each field.

Some of the faults in this book are inherent in the basic editorial design. The degree of compression of material required by the size and scope has frequently resulted in a stripped skeleton of no value to anyone, such as the 30 lines on gout or the single page on Pott's disease in the section on orthopedic surgery. This brevity approaches the danger point in many areas where essential information is omitted. In the section on pediatrics, neomycin is advocated for infant diarrhea with no warning of its toxicity and no suggestion for a stool culture prior to instituting therapy. Other faults are even less easy to explain or condone. In the discussion of dog bite and rabies prophylaxis in the section on pediatric immunization, there is no mention of the existence of rabies antiserum although this is an essential part of modern management. In the section on nose and throat, there is no mention of ear infections as an indication for tonsillectomy, but tonsillectomy is recommended to eradicate foci or infection when no other cause can be found even in the absence of any tonsillar pathology. In this same

section, septic sore throat is vaguely considered as being due to a variety of secondary invaders following a viral infection. The statement is made that beta hemolytic streptococci are implicated in only 25 per cent of the cases. In treatment, sulfa drugs are considered of equal value with penicillin and doubt is expressed as to whether every infection should be treated with antibiotics at all. Neither rheumatic fever nor the suppurative complications of streptococcal diseases are mentioned.

This book is not recommended. The sections which are accurate and up to date are too brief to be of any real value, and others contain misinformation.— *CHRISTIAN GRONBECK, Jr., Lt. Col., MC, USA*

SCOVILLE'S THE ART OF COMPOUNDING, by *Glenn L. Jenkins, Don E. Francke, Edward A. Brecht,* and *Glen J. Sperandio.* 9th edition. 551 pages; illustrated. The Blakiston Division, McGraw-Hill Book Co., Inc., New York, N. Y., 1957. Price $11.

This new edition of a standard work is greatly improved in several respects. Like former editions, it concentrates on the study of compounding and dispensing, and eliminates related but extraneous subjects such as manufacturing processes and administration of drugs. Every part has been revised and brought up to date. Several of the chapters have been completely rewritten, and the work has been made more suitable for use as a textbook.

The authors have arranged the material so that the student progresses systematically from the simpler to the more complex problems of compounding and dispensing. They have kept in view two main objectives: first, to present the principles underlying each practice, so that the student may understand the theories as well as perform the operations involved in compounding; and second, to illustrate the principles by prescriptions and exercises and to show their practical utility at the prescription counter. They have kept the volume to a convenient size by the omission of illustrations or subject matter that have become obsolete or belong properly in other courses, and have added to its practical value by using illustrative examples drawn from actual practice. The section on incompatibilities is especially improved by the inclusion of many new items, and is arranged so that it may be used by itself as a one-term course.

The new chapter on ophthalmic solutions and the enlarged chapters on powders, capsules, and effervescent salts, tablets, parenteral solutions, isotonic solutions, sterilization and infection, and ointment and ointment-type preparations are a few examples of the improvements and modernization to be found in the treatment of every subject. The authors deserve the thanks of both students and practicing pharmacists for the thought and labor they have expended in making this new edition so valuable as a textbook and work of reference.

—*RUSSELL L. TAYLOR, Capt., MSC, USN*

FUNDAMENTALS OF CLINICAL NEUROPHYSIOLOGY, by *Paul O. Chatfield,* M. D. 392 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $8.50.

This review of the fundamentals of neurophysiology is an elaboration of material the author has presented to the first-year course in physiology at Harvard Medical School.

The basic mechanisms responsible for the special functions of the nervous system are discussed. The early chapters cover the membrane potential and the nerve impulse, electrical excitation of nerve, and action potentials in single fibers and mixed nerves. After a discussion of the general physiology of receptor organs, the author discusses the various senses. A brief review of muscle physiology is included. Reflex activity in the nervous system is described at the various levels of organization. Cerebellar and cerebral cortical function is presented in considerable detail, as well as the inter-relationships between various brain centers.

The bibliography is extensive and the reader may at times get lost in the barrage of names and dates that document nearly every paragraph. However, patience with these details will reward the student with a good orientation to "the better established facts of neurophysiology" as the author writes. This book will be of interest to medical students and persons entering the clinical fields of neurology and psychiatry.—*ROBERT L. WILLIAMS, Maj., USAF (MC)*

CLINICAL PROCTOLOGY, by *J. Peerman Nesselrod,* B. S., M. S., M. Sc. (Med.), M. D., F. A. C. S., F. A. P. S. 2d edition. 296 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1957. Price $7.

This is a practical, concise, and orderly presentation of proctologic precepts, beginning with a discussion of pertinent anatomy and physiology, proceeding through diagnostic procedures, and describing the common anorectal diseases. Pre and postoperative care is thoroughly discussed, and congenital malformation, neoplastic disease, and anal pruritus are considered. The final chapter gives a brief discussion of miscellaneous subjects such as bowel management, enemas, laxatives, suppositories, fecal impaction, anal incontinence, and anorectal neuroses. The chapter on clinical proctoscopy is particularly good and includes black-and-white and color photographs made through the proctoscope.

Unlike much current scientific literature, this book is written in an easy, straightforward style which approaches personal teaching by the author himself. The illustrations and photographs are the perfect complement to the text material. The medical student will find this book complete and readily understandable. The house physician or practicing physician who reads it will find himself more confident (and of greater service) in his approach to proctologic problems. It is highly recommended for anyone who does or contemplates doing proctoscopic examinations or any type of proctologic treatment.

—*JAMES H. STEWART, Lt. Comdr., MC, USN*

SOCIOLOGY, Its Use in Nursing Service, by *Gladys Sellew,* B. S., R. N., Ph. D., and *Paul Hanly Furfey,* Ph. D., LL. D. 4th edition. 502 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1957. Price $5.

This revised edition follows the general concepts of sociology and its application in nursing practice. The first part is a general outline of a beginning course in first-year college sociology, followed by a discussion of the relation of health to social conditions. The final part deals with the social conditions and problems the nurse may meet in the care of patients in hospitals, clinics, and in public health work. The last three chapters deal with illnesses in the various age groups and the sociopsychologic factors to be considered in each.

The text is written in terms which can be understood by the beginner in both sociology and nursing. At the end of each chapter topics for discussion and selected references are listed. The chapter on human groups should be particularly helpful to the beginner in developing an awareness of groups and subgroups within the social structure of a society and the social processes which make for unity or disunity in that society. The authors have achieved their purpose in providing a helpful text for nursing students and the book should be well received.

—*CHARLOTTE R. RODEMAN, Maj., ANC, USA*

ENCYCLOPEDIC GUIDE TO NURSING, by *Helen F. Hansen,* R. N., M. A. 406 pages; illustrated with 8 colored plates. The Blakiston Division, McGraw-Hill Book Co., Inc., New York, N. Y., 1957. Price $6.

This volume, of standard nursing textbook size, is the result of an endeavor to fulfill the need for a reference book of definitions, guiding principles, brief summaries of subjects, and explanations of technics and procedures. To make it of practical value to nurses, scientific detail and terminology have been reduced. The terms listed are those in current use in the medical field and afford the reader clear explanations of up-to-date medical technics and nursing procedures. Full discussion of topics is one of the strong points of the book. Detailed nursing procedures are given in conjunction with definitions where applicable. The illustrations are limited to a set of excellent colored plates of the skeletal, muscular, arterial, and venous systems, and of the viscera.

The pronunciation guide is not complete. Reference must be made to a standard dictionary. The appendices include a list of commonly used abbreviations, prefixes and suffixes, and tables of elements, equivalent centigrade and Fahrenheit temperatures, and weights and measures. The completeness of the definitions of the terms listed and the cross references indicated show the author's respect for detail. This volume is intended as a reference book for nursing service.

In comparison of Hansen's "Encyclopedic Guide to Nursing" and Taber's "Cyclopedic Medical Dictionary," the former would be a fine supplement to but not a replacement for the Taber volume. If one volume is to be chosen for use by all levels in the medical field, Taber's Cyclopedic Medical Dictionary would be of most value.

—*EMMA F. HOUSTON, Lt. Col., ANC, USA*

DYNAMICS OF PSYCHOTHERAPY, the Psychology of Personality Change, Volume II, by *Percival M. Symonds,* Ph. D. 440 pages. Grune & Stratton, Inc., New York, N. Y., 1957. Price $6.50.

This is the second book of a three-volume series devoted to the principles and practice of psychotherapy. Whereas the first volume was concerned with basic viewpoints and with the nature of psychoneurosis, the present work deals elaboratively with the client-therapist relationship as it develops through the processes of transference, resistance, abreaction, insight, and identification. The third book will be concerned with various practical therapeutic procedures. All three volumes are intended both as texts for students of psychotherapy and as reference works for established practitioners.

Although the author's theoretical orientation is clearly visible throughout the exposition,. little attention is paid to abstruse and speculative concepts as such. On the contrary, the principal merit of the book seems to this reviewer to be in the rich and detailed description, analysis, and interpretation of the client's therapeutic experience at the behavioral level. What actions and attitudes to expect, how to recognize them, what their motivations are, and what their significance is for the therapeutic process as a whole are skillfully discussed.

From all points of view this book is exceptionally readable. It is well organized, and its literary quality is superior. An annotated bibliography of some 240 titles enhances its value as a reference. It would be a valuable addition to the libraries of physicians, psychiatrists, clinical psychologists, and others concerned professionally with counseling and guidance.

—*ROBERT B. PAYNE, Lt. Col., USAF (MSC)*

LAW EVERY NURSE SHOULD KNOW, by *Helen Creighton,* B. S. N., R. N., A. B., A. M., J. D. 197 pages. W. B. Saunders Co., Philadelphia, Pa., 1957. Price $3.50.

In this paper-bound "handbook" the author has presented in a clear, concise, and nontechnical manner the various phases of law which every nurse should know or be familiar with. A valuable and most informative book, it is one of the few written for nurses on this subject as it pertains to the practice of their profession. A brief presentation of the structure of our government, the sources of law, and function of the courts is followed by the purpose and problems of licensure for both the practical nurse and the professional nurse. Contracts, including breach and termination of contracts, are discussed in order that the nurse will know her rights, duties, and liabilities regarding them.

The legal status of the nurse and her rights and liabilities in relation to her position and status are also discussed. In the chapter on negligence and malpractice, the author discusses and illustrates briefly the common acts of negligence and malpractice acts and the

nurse's liability in regard to them. Torts and criminal acts from misdemeanors to felonies which the nurse is likely to encounter are presented as well as her responsibility as a witness in legal procedures and the making of wills. The last chapter is devoted to the legal aspects of nursing in Canada. There is an excellent table of contents and a good index. Also, following each chapter is a list of case references as well as general reference readings.

This book is one which every nurse should have in her possession as a ready reference regarding her legal rights, duties, and liabilities.

—AILEEN E. BRIMMER, Maj., USAF (NC)

ORAL DIAGNOSIS AND TREATMENT (Oral Medicine), A Textbook for Students and Practitioners of Dentistry and Medicine, by *Samuel Charles Miller,* D. D. S., F. A. C. D., F. A. D. M., and 37 *contributors,* with an introduction by *Raymond J. Nagle,* D. M. D., F. A. C. D. 3d edition. 977 pages; 577 illustrations in black and white and 30 color plates. The Blakiston Division, McGraw-Hill Book Co., Inc., New York, N. Y., 1957. Price $16.

An old light burns with new luster as Dr. Samuel Charles Miller's "Oral Diagnosis and Treatment" keeps pace with 10 years' advance of dental science. The new third edition, as were the two previous editions, will be a valuable aid to the accurate practice of dentistry. Dr. Miller has edited the work of 37 experts into an authoritative 30-chapter volume which is a specific guide to the scientific approach to oral diagnosis. The presentation is masterful and concise.

Although the title of this book includes the term "treatment," this aspect, as might be expected, runs second to the clean-cut work in diagnosis. Treatment is discussed more on a suggestive basis of an outline type. With the references included, it can be a satisfying guide to treatment. It would not be fair to expect to cover the field in both diagnosis and treatment in a single volume of less than one thousand pages. There is one amazing new chapter on "Identification Keys as Diagnostic Aids." This is, ". . . an organized plan of analysis" using as keys the parts affected coupled with the signs and symptoms. It is a clever and well-planned procedure. Making the key to unlock the "unfamiliar condition" is a fascinating process.

Dr. Miller's standard text has become a part of almost every dental practice. The added coverage of this new edition should make it even more useful to the profession. The chapter on aviation dentistry, alone, will endear this volume to many practitioners. Nine of the chapters are entirely new. More than ever, this book is the cornerstone for every dental library.—*JULES D. KARTMAN, Lt. Col., USAF (DC)*

New Books Received

Books received by the *U. S. Armed Forces Medical Journal* are acknowledged in this department. Those of greatest interest will be reviewed in a later issue.

HORMONAL REGULATION OF ENERGY METABOLISM, compiled and edited by *Laurance W. Kinsell,* M. D. 242 pages. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $5.25.

TEN MILLION AND ONE, Neurological Disability as a National Problem, Arden House Conference, Sponsored by *The National Health Council.* 102 pages. Paul B. Hoeber, Inc., Medical Book Department of Harper & Brothers, New York, N. Y., 1957. Price $3.50.

CLINICAL GASTROENTEROLOGY, by *Eddy D. Palmer,* M. D., F. A. C. P. Illustrations by *Phyllis Anderson.* 630 pages; illustrated. Paul B. Hoeber, Inc., Medical Book Department of Harper & Brothers, New York, N. Y., 1957. Price $18.50.

Craig and Faust's CLINICAL PARASITOLOGY, by *Ernest Carroll Faust,* A. B., M. A., Ph. D., and *Paul Farr Russell,* M. D., M. P. H., with the Editorial Assistance of *David Richard Lincicome,* B. S., M. S., Ph. D. 6th edition. 1078 pages; 346 illustrations; 7 plates in color; 23 tables. Lea & Febiger, Philadelphia, Pa., 1957. Price $15.

DE MOTU CORDIS (Movement of the HEART AND BLOOD in Animals). An Anatomical Essay by *William Harvey.* Translated from the original Latin by *Kenneth J. Franklin* and now published for the Royal College of Physicians of London. 209 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $3.50.

LENS MATERIALS IN THE PREVENTION OF EYE INJURIES, by *Arthur Hail Keeney,* M. D., D. Sc. American Lecture Series, Publication No. 307, A Monograph in American Lectures in Ophthalmology, edited by *Donald J. Lyle,* M. D., F. A. C. S. 73 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill. 1957. Price $3.50.

MEDICAL RADIATION BIOLOGY, by *Friedrich Ellinger,* M. D. 945 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $20.

METHODS OF GROUP PSYCHOTHERAPY, by *Raymond J. Corsini,* Ph. D. 251 pages; illustrated. The Blakiston Divison, McGraw-Hill Book Co., Inc., New York, N. Y., 1957. Price $6.50.

MODERN PERINATAL CARE, by *Leslie V. Dill,* M. D., F. A. C. S. 309 pages; illustrated. Appleton-Century-Crofts, Inc., New York, N. Y., 1957. Price $6.50.

PSYCHOPATHIC PERSONALITIES by *Harold Palmer,* M. D. 179 pages. Philosophical Library, Inc., New York, N. Y., 1957. Price $4.75.

BIOCHEMISTRY, by *Abraham Cantarow,* M. D., and *Bernard Schepartz,* Ph. D. 2d edition. 867 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1957.

THE YEAR BOOK OF CANCER (1956-57 Year Book Series). Compiled and edited by *Randolph Lee Clark, Jr.*, B. S., M. D., M. Sc. (Surgery), D. Sc. (Hon.), and *Russell W. Cumley*, B. A., M. A., Ph. D. 572 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1957. Price $7.50.

THE HUMAN BRAIN, From Primitive to Modern, by *A. M. Lassek*, M. D., Ph. D. 242 pages. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $4.75.

CHEMISTRY OF ORGANIC COMPOUNDS, by *Carl R. Noller.* 3d edition. 978 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1957.

HANDBOOK OF TOXICOLOGY, edited by *William S. Spector;* compiled from the Literature by *John N. Porter* and *Gilbert C. De Mello.* Volume 2: Antibiotics. Prepared under the Direction of the Committee on the Handbook of Biological Data, Division of Biology and Agriculture, The National Academy of Sciences, The National Research Council. 264 pages. W. B. Saunders Co., Phildaelphia, Pa., 1957.

FUNDAMENTALS OF HUMAN PHYSIOLOGY for Students in the Medical Sciences, by *W. B. Youmans,* Ph. D., M. D. 567 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1957. Price $8.50.

ANESTHESIA, A Manual for Students and Physicians, by *Stuart C. Cullen,* M. D. 5th edition. 295 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1957. Price $5.50.

THE EFFECTS OF NUCLEAR WEAPONS, edited by *Samuel Glasstone.* Prepared by the United States Department of Defense. (Air Force Pamphlet No. 136-1-3). Published by the United States Atomic Energy Commission, June 1957. 579 pages; illustrated. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price $2. (paper bound).

DISEASES OF THE EXTERNAL EAR, by *Ben H. Senturia,* A. B., M. D. American Lecture Series, Publication No. 319, A Monograph in The Bannerstone Division of American Lectures in Otolaryngology, edited by *Norton Canfield,* M. D. 211 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $8.50.

SURGICAL TECHNIQUE and Principles of Operative Surgery, by *A. V. Partipilo,* M. D., F. A. C. S. Foreword by *Alton Oschsner,* M. D., F. A. C. S. 6th edition. 966 pages; 1,235 illustrations on 719 figures, 4 in color. Lea & Febiger, Philadelphia, Pa., 1957. Price $20.

METHODS IN SURGICAL PATHOLOGY, by *Henry A. Teloh,* M. D. 127 pages. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $4.75.

THE BASES OF TREATMENT, by *Neuton S. Stern,* A. B., M. D., and *Thomas N. Stern,* M. D. 176 pages. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $4.75.

THE DERMATOLOGIST'S HANDBOOK, by *Ashton L. Welsh,* M. S., M. D. American Lecture Series, Publication No. 293, A Monograph in the Bannerstone Division of American Lectures in Dermatology, edited by *Arthur C. Curtis,* M. D., 427 pages. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $15.

THE MALABSORPTION SYNDROME, A Mount Sinai Hospital Monograph. Editor: *David Adlersberg,* M. D. Contributions to the Symposium by Members of the Staff of the Mount Sinai Hospital, New York. 252 pages; illustrated. Grune & Stratton, Inc., New York, N. Y., 1957. Price $5.50.

U. S. GOVERNMENT PRINTING OFFICE : 1957 O - 444645

V811 NOV 57
XU